Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation

http://www.archive.org/details/n1industrialworl46pittuoft

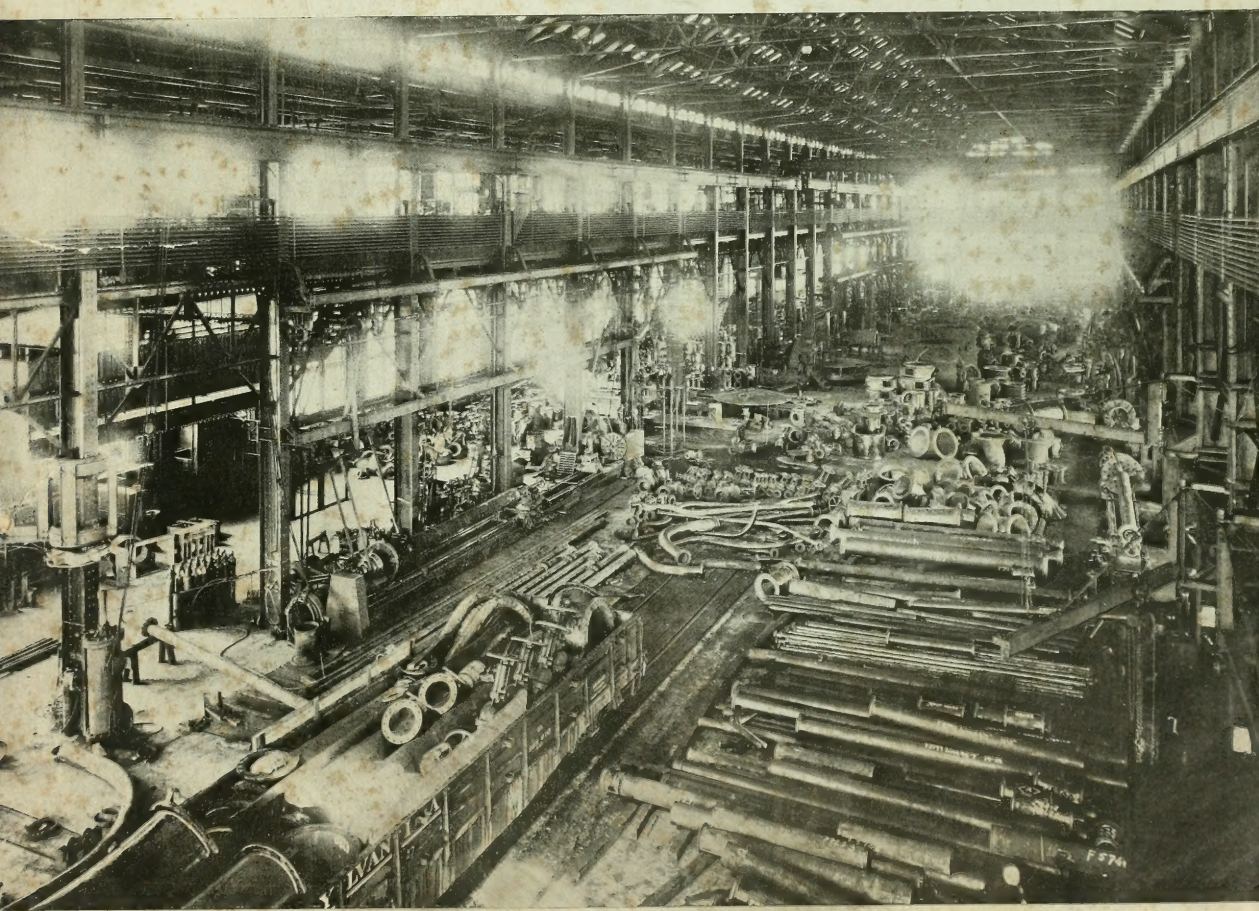
LIBRARY
FEB 20 1912

INDUSTRIAL WORLD

Published Weekly in the Interest of Iron, Steel, Coke and Allied Industries.

46th Year. No. 1. PITTSBURGH, PA. MONDAY, JANUARY 1, 1912

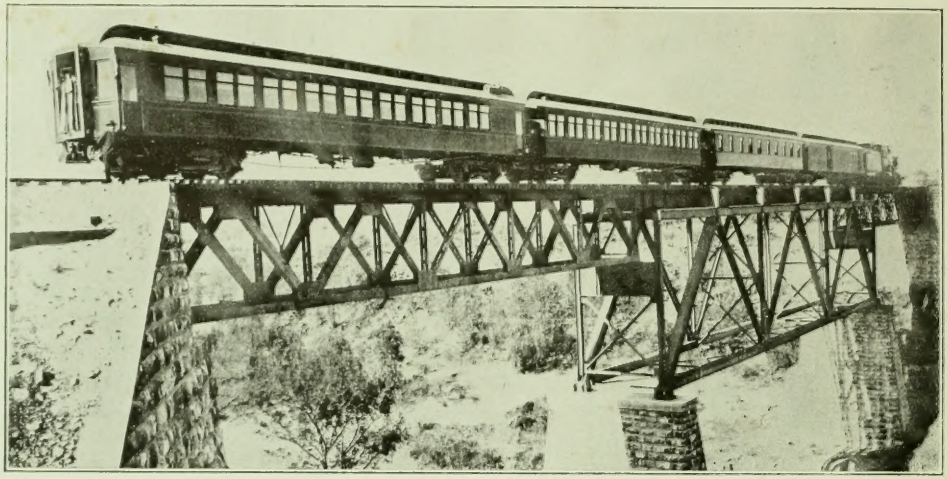
MACHINE SHOP VIEW, BEST MANUFACTURING CO.'S NEW PLANT, OAKMONT



[See Description, Page 10]

Index to Advertisers, Page xx.

Classified Index Pages xxi, xxii, xxiii, xxiv, xv, xxvi xxvii.

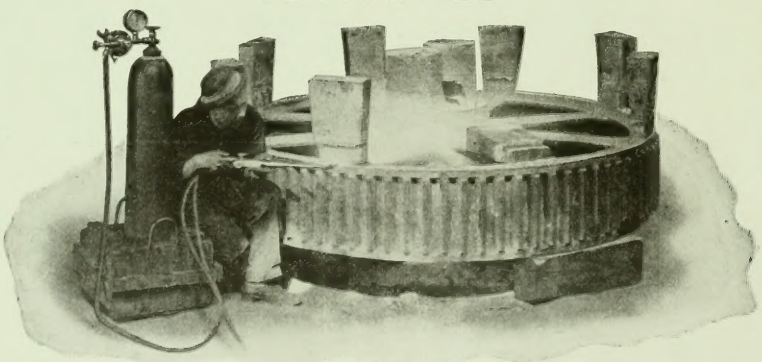


TULA RIVER BRIDGE, MEXICAN NATIONAL R. R.

RITER-CONLEY MANUFACTURING CO.
PITTSBURGH
ALL CLASSES OF BRIDGE, STRUCTURAL AND PLATE WORK

OXY-ACETYLENE
WELDING & CUTTING
APPARATUS

EFFICIENT
ECONOMICAL



SIMPLE
RELIABLE

Cutting risers from machine moulded gear at the Works of the Mesta Machine Company. These Risers which measured 4 in. x 8 in. were removed with the "UNIVERSAL CUTTER" in 1½ minutes each.

THE LINDE AIR PRODUCTS CO.
Head Office and Works: BUFFALO, N. Y.

INDUSTRIAL WORLD

Publication Office, 108 Smithfield Street, Pittsburgh, Pa. Bell, 3909 Court. Ten Cents Per Copy—$3.00 Per Year.

FORTY-SIXTH YEAR. PITTSBURGH, PA., JAN. 1, 1912. NUMBER ONE.

INDEX OF LEADING ARTICLES AND DEPARTMENTS

NEWS—
U. S. Steel's Annual Distribution, News of Pittsburgh District 2
Equipment News 2
Resumptions of Plants 3
New Design Sheave Block Constructed by Pittsburgh Company (Ill.) 3
Fender Equipment at Panama Canal 5
News of the Railroads and Railroad Builders: Steel Car Orders of Week 6
Armor Patent Cases in Supreme Court 9

DEPARTMENTS—
Trade Meetings 4
Customs Decisions 4
Personal 5
Coming National Conventions 20
Industrial Fires 21

FEATURES—
Westinghouse Installations of Power Equipment for London Tramways (Ill.) 7
Pittsburgh Man's Ideas Embodied in New Safety Limit Stop (Ill.) 8
A Hollow Tile Silo for Agricultural Uses (Ill.) 9
New Plant of Best Manufacturing Company, at Oakmont, Pa. (Ill.) 10
Industrial Accidents: A German Report 13
The New British Steel Combination 15

INDUSTRIAL SECURITIES—FINANCIAL—
Stock Summary: Week's Sales in Leading Cities 16
Fiscal Statements: End-of-Year-Dividends 16
Business Troubles 17

EDITORIAL—
"The Old Year" 18
"Monthly Average Prices, Iron and Steel Products, Year 1911" 19
"Twenty Years Ago" 20
Review of Pig Iron Trade for Year 20

STATISTICAL—
Coal Output of Appalachian States for 1911; Government Estimates 14
Ore Record for Year 1911 17
Swedish Iron and Steel Export Trade 21

THE MARKETS—
Pig Iron Markets: Principal Sales of the Week 22
Coke; Crude and Finished Steel 23
Range of Weekly Quotations on Pig Iron and Finished Product 24

"NEW BUYERS" DEPARTMENTS—
New Construction and Extensions 28
Charters to New Corporations 30

MISCELLANY—
Sun Valves at Panama 29
"Prices of Coal and Materials Used in Mining Compared": E. N. Zern iii
A Japanese Bridge Project ix
Natural Cement vs. Portland Cement; U. S. Geological Survey Analysis x
Magnesite Output of United States xi
A Foundry for Chilled Castings xiii
Modern Uses of Electric Power in Concrete Construction Plants xv
Size of Coal Pockets xvi

Summary of General Iron and Steel Markets

PIG IRON.—Heavy buying through holidays, though prices are slow in rising. Inquiries aggregating fully 50,000 tons steel making irons pending in Western Pennsylvania and Eastern Ohio. Foundry iron stronger in Valleys; producers asking $13.25 furnace. Basic for first half has sold at $12.45 Valley furnace. Buffalo prices up 50 cents. Ironton continues on $13 basis. Southern market unchanged.

CRUDE STEEL.—Billets and sheet and tin bars have gained 50 cents to $1 a ton over prices quoted before Christmas. Minimum on Bessemer and open hearth billets is $20; on forging billets, $26; on sheet and tin bars, $21.

BAR IRON.—Puddled iron in heavier demand; price firmer at 1.25c minimum. Brown mill, Pittsburgh, resumes in full to-morrow. Byers and Moorhead plants order on additional capacity.

SHEETS.—Mills filled; additional capacity to start this week. Lower prices on sheets have gradually disappeared, and market is firm at basis of 1.90c for black, 2.90 for galvanized and 1.40 for blue annealed, Pittsburgh.

BARS.—The advance in steel bars has been maintained at the 1.15@1.20c level, and a considerable amount of business has been closed in nails at $1.55.

WIRE. — Healthier demand; Pittsburgh plants resume coming week. Rumored price increase of $1 a ton with first of year.

PLATES AND SHAPES.—Prices firm on 1.15c minimum; slight falling off in orders during holidays.

Points on the Market

Tonnage and Orders.—The Steel Corporation last week operated at 80 per cent of maximum capacity, which means that deliveries are being made at the rate of close to 36,000 tons a day, or 19,000 tons a day below the rate of incoming business, which was estimated at 55,000 tons a day. The rate of operations the coming week will be increased to approximately 85 per cent of maximum capacity.

Operations at Aliquippa.—A part of the eight new tin plate mills of the Janes & Laughlin Steel Company at Aliquippa will start the coming week. The wire and rod mills of the company at Aliquippa are running about 80 per cent of capacity and four new Talbot open hearth furnaces will be lighted about the middle of January, using pig iron bought in the open market. It has not been announced when the company will start its four Aliquippa stacks.

Braddock Furnaces Resume.—Four blast furnaces of the Edgar Thomson group of the Carnegie Steel Company, at Braddock, were lighted December 28, after an idleness of several months. This puts in blast the last idle stack of the Steel Corporation but one in Allegheny county.

Rail Business Pending. — Rail manufacturers in this district say that during the next 10 days railroads are expected to announce the award for over 600,000 tons of rails for the 1912 delivery, making a total tonnage for the new year of 1,500,000 tons.

Sparrows Point Resumes.—After being idle for two months owing to lack of business, the steel-making departments of the Maryland Steel Company's Baltimore plant at Sparrows Point, were put in operation December 27.

Manganese. — No resale ferromanganese appears to be coming out upon the sharp advance of $2.50 in the price made by the English syndicate. Practically as soon as the $38.50, Baltimore, price was thoroughly established by the absorption of all cheaper material the price was withdrawn (December 15th) and a few days later a price of $41, Baltimore, was named.

U. S. STEEL'S ANNUAL DISTRIBUTION; BONUS FUND A LITTLE MORE THAN HALF 1910's.

PRICES TO BE ASKED FOR STOCK ON PROFIT-SHARING BASIS NOT YET ANNOUNCED—ANNOUNCEMENTS YET TO COME.

The following statement was issued December 27 by the United States Steel Corporation relative to the annual distribution of stock to employes.

"U. S. Steel Corporation has made its annual distribution to the employes of the corporation and subsidiary companies under its bonus plan, which has been in force nine years. The amount distributed for 1911 is $1,450,000.

"The corporation will also offer to its employes the right to subscribe to about 25,000 shares of stock as usual, on the basis of the plan which has been in force for the period above stated. The price has not yet been fixed, but it will probably be a little lower than the market."

Directors of the corporation, at their last regular meeting for the year, on December 26, agreed on allotments of common and preferred shares for the corporation's profit-sharing plan, but amounts and prices were not disclosed.

The bonus distribution this year, $1,450,000, compares with $2,700,000 bonus distributed last January for the year 1910. Last year's bonus was paid 40 per cent in cash and 60 per cent in common stock at $70 per share. The year preceding, the bonus was paid 60 per cent in cash and 40 per cent in preferred stock at $124 a share or common stock at $90 a share.

Last year's stock subscription under the profit-sharing plan, was made to the corporation's employes on the basis of $114 a share for the preferred and $70 a share for the common stock.

Between 25,000 and 30,000 employes of the Steel Corporation are stockholders. Since 1903 they have subscribed for 237,632 shares of preferred and 44,437 shares of common. Including this year's allowance of 25,000 shares employes will own stocks with a par value of over $30,000,000. All told there are about 120,000 stockholders.

Steel Freight Hearings.

Hearings in the freight rate cases on steel products continued at Washington last week. Opposing the suspension by the Interstate Commerce Commission of advances in rates on iron and steel articles on 125 railroads operating in Official and Central Freight Associations' territory, representatives of these railroads before Commissioner Lane on December 27 declared that they are now operating this traffic at a loss and it did not carry its just share of the expenses. The commission recently started an investigation as to the reasonableness of the advances on traffic moving from Pittsburgh and other points in Pennsylvania to Davenport, Ia.; Rock Island and Moline, Ill., and other Mississippi river points. The hearing on Wednesday and Thursday was for the purpose of giving the railroads a chance to present their side of the question.

MAKE THE FIRST STEEL

To-Day, at New No. 2 Plant of Union Steel Casting Company.

With the exceptions of a pattern storage building and a repair shop, the buildings and equipment of the Union Steel Castings Company's No. 2 plant, in the Butler street district, Pittsburgh, has been completed and will be put in operation during the week. The two new 25-ton open hearth furnaces were fired last week, and arrangements were made for running the first heat to-day (Monday).

Two of the three new open hearth furnaces planned for the new plant have been completed, while space has been left for the erection of a third furnace, the plant being designed on a basis of three 25-ton open hearths.

D. A. Synder will superintend the operation of the new plant with the following assistants: T. D. Horton, master mechanic; Hugh O'Hara, foreman of open hearth department; John Field, foreman of molding department.

J. & L. LEASE LAND.

Addition to Second Avenue, Pittsburgh, Site, Is Taken Over.

The Jones & aughlin Steel Company last week closed for a 10-year lease of a tract of land 3.7 acres in extent in Second avenue, Pittsburgh, adjoining its present Soho plant. The lease carries the privilege of purchase of the tract at $250,000.

The statement is authorized that the company has no immediate plans for improvements, but wished to control the property, which possesses strategic value, for possible future improvements. The property has been owned by Irons & Todd, New York, and until recently was held under lease by R. C. Hall, of Pittsburgh, for the Duquesne Light Company.

According to a consular report from Ontario, capital is being raised in New York to establish steel works at Portcolborne, Ont., to cost $1,000,000.

EQUIPMENT NEWS

Improvements at Ohio Furnace.

Contracts were awarded last week by the Globe Iron Company, Jackson, Ohio, for improvements to its blast furnace plant, which will include the installation of an automatic skip hoist by the Otis Elevator Company, to replace a vertical hoist. A contract for the structural steel work, was placed with the Variety Iron & Steel Works Company, Cleveland.

Power Equipment.

Contracts were awarded December 27, by the board of commissioners of the Lima State Hospital, Lima, Ohio, for equipment of a new power plant at a cost of $109,944, to the Samuel A. Esswein Heating & Plumbing Company, Columbus, Ohio. The contract includes piping and apparatus for heating at $70,000. An order for four 350-horsepower boilers was placed with the McNaull Boiler Company, Toledo, and orders for four engines aggregating 1,000 horsepower, was placed with the Buckeye Engine Company, Salem, Ohio.

Mixer for Lackawanna Mills.

The Pennsylvania Engineering Works, New Castle, Pa., last week secured the contract from the Lackawanna Steel Company, Buffalo, for a 600-ton mixer, for the duplex steel department of the Lackawanna. The contract calls for installation complete in five months.

Contract for Gas Producers.

The Youngstown Sheet & Tube Company has awarded contracts for 18 gas producers, which will be built in Cleveland by the Wellman-Seaver-Morgan Engineering Company, and to be ready for installation before the new open hearth plant of eight furnaces is completed.

Bids on Bridge Rejected.

The Hamilton county (O.) commissioners, at Cincinnati, last week decided to readvertise the contract for a bridge over Millcreek and rejected all bids received. Thomas J. McKim was the low bidder on the work, but he failed to complete certain other contracts which had been awarded to him by the board and the time limit on which has expired. McKim's bid was $12,115.

Buffington Plant Near Completion.

Construction of plant No. 6 of the Universal Portland Cement Company, a subsidiary of the Steel Corporation, at Buffington, Ind., the most recent and largest addition to their several plants, is rapidly nearing completion. All the

buildings are constructed of steel and concrete, including reinforced concrete and tile and slab roofs.

The output, combined with that of plants 2, 3, 4 and 5, gives the company a daily output of 40,000 barrels per day, which is at the rate of 12,000,000 barrels of Universal Portland cement per year.

RESUMPTIONS ANNOUNCED.

Carnegie Company Furnaces.

The following blast furnaces of the Carnegie Steel Company were fired on December 28, after varying periods of idleness:

Four stacks at Edgar Thomson plant, Braddock; Rosena furnace in Shenango valley and No. 2 furnace at the Ohio plant at Youngstown. No. 3 stack at the Ohio works was fired up the latter part of the week and was making iron January 1.

The Company's Rosena furnace at New Castle had been idle since May 6. During the period of idleness the plant was almost entirely rebuilt. The Rosena, one of the oldest furnaces in the Shenango Valley, had worked its machinery out and it was found that it would have to be practically rebuilt. The furnace was relined, the stoves were put into the best of shape and everything about the plant was put in the best possible condition.

No. 2 furnace at the company's Ohio plant, Youngstown, was shut down October 9 and the No. 3 on November 10. The two stacks were repaired while idle. With the starting of furnaces Nos. 2 and 3, all of the Bessemer stacks at the Ohio works are in operation. The Bessemer department and open hearth departments of the Carnegie Company at Youngstown will operate to full capacity the coming week.

Shelby Tube Mills.

It was announced by the National Tube Company on December 27 that both plants of the Shelby Tube Company at Ellwood City, Pa., would resume operations in full this week. Last week the mills were put into the best of shape for a long run. The mills have been working only part time for several months.

Resumptions in Eastern Pennsylvania.

It is announced at Reading, Pa., that the Temple anthracite blast furnace will be started up about January 10. This stack went out of blast February 10, 1910. It has a capacity of about 1,000 tons a week.

At Sheridan, Pa., the two stacks of the Berkshire Iron Company at that place, which have been out of blast for a long time, will be started up January 1. This means additional work at the Cornwall ore mines. Extensive repairs and improvements have been made.

OHIO RIVER PACKET MERGER.

Through New Orleans Service From Pittsburgh Likely to Result.

With the great improvement of the Ohio river navigation as the government slackwater improvements proceed river interests and manufacturing concerns along the upper Ohio Valley last week started a movement to co-operate in efforts now under way to merge the large packet lines of the district. The completion of this consolidation is expected to simplify matters and result in better conditions.

It is said that if the merger is consummated, as expected, local trade will be extended as soon as possible to New Orleans, there having been sufficient through tonnage assured to make the project a success.

It is rumored that if all the lines invited do not enter the proposed combination, the others will merge. Only one line, it is said, is dissatisfied with the financial inducements offered.

STOKER EQUIPMENT.

For Kentucky and Pennsylvania Plants.

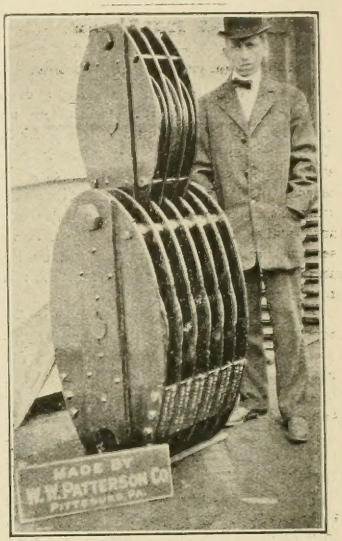
The Consolidation Coal Company, Fairmont, W. Va., has placed orders for six 430-horsepower Rust boilers to be installed in its Jenkins plant in Kentucky. The boilers are to be operated with stokers made by the Detroit Automatic Stoker Company, Detroit. The latter company has also secured a contract for the installation of its stokers to operate one 300-horse power and two 250-horsepower boilers in the power plant of the National Lead & Oil Company, New Kensington, Pa. The boiler plant is being remodeled and coal handling equipment will be installed.

Ferro-Concrete Patent Void.

In the Federal Court at Cincinnati, last week, Judge Hollister made an entry in the suit of the Ferro Concrete Construction Company vs. the Concrete Steel Company and Isaac Faller Sons' Company sustaining the demurrer of the defendants in accordance with his opinion of last week. In his decree the court holds that patent No. 859,511, granted to Louis H. Nolte July 5, 1907, for concrete floor construction "is wholly void upon its face for want of patentable invention and novelty," as alleged in the demurrer.

Try a Want or For Sale ad in the INDUSTRIAL WORLD.

HEAVIEST SHEAVE BLOCK EVER MADE.



Nine-sheave block, constructed by W. W. Patterson Company.

THE W. W. Patterson Company, 54 Water street, Pittsburgh, has completed a pair of nine-sheave blocks for the McClintic-Marshall Construction Company which the manufacturers claim are the heaviest and strongest sheave blocks ever made, the safe working load of the blocks being 125 tons. As will be seen by the accompanying illustration a standard triple sheave block is attached to the bottom of a six-sheave block, giving the same working effect as a nine-sheave block and reducing the strain which would be occasioned upon a longer center pin. This novel method of reaving blocks was made necessary for the operation of a short mast and a long boom 20 and 50 feet respectively.

The blocks were for the topping lift of a derrick car being used by the McClintic-Marshall Company in the construction of the Western Maryland railroad, at Ohio Pyle, Pa. With this car the construction company has been setting 50-ton girders. All plates in the blocks are ½-inch thick, side straps are 8 inches by ¾ inch, sheave pins 3 inches, bottom bolt, by which triple block is attached 2½ inches, sheaves 20 inches diameter, metaline bushed and grooved for ⅞ inch, weight of each block 2,374 pounds. There were no shackles to the blocks, which were attached to the car

by 4½-inch head bolts. These blocks were shipped by the Patterson Company within one week of the receipt of the order.

CHEAT RIVER DAM.

Kuhn Interests Buying Up Site.

Three tracts of land involving a cash consideration of $20,000 were taken up Saturday by the Mountain Park Land Company, the new Cheat river hydro-electric interest backed by the Kuhn interests of Pittsburgh, which has its headquarters in Connellsville. The properties are located along the Cheat and involve several hundred acres which will be inundated when the proposed new dam is completed.

A large number of properties are under option by the Mountain Park Land Company and are being bought and paid for immediately upon the expiration of the options. A large acreage has already been paid for by the company and there is every indication that the actual construction work will begin in the early spring.

No more litigation is expected in the acquisition of territory for the new dam. in a distance of some 25 miles up Cheat river there are some 10 or 12 houses and options have been taken on all except one. Immediately upon the expiration of the options these properties will be taken up by the company.

The work of making soundings for the rock foundation is progressing rapidly. Several corps of engineers are at work in the field. Representatives of the new company are active at Morgantown, W. Va.

Boiler Makers' Strike Ends.

At Conshohocken, Pa., arbitration between a committee of striking employes of the John Wood Manufacturing Company and officials of the firm resulted in the men voting unanimously to return to work, and the plant resumed operations in full December 26. The strike thus ended had been on for 11 weeks, 300 boiler makers being involved. The new agreement is perfectly satisfactory to both the men and the company. When the strike was called the boiler makers claimed that a reduction of from 10 to 33⅓ per cent in their wages had been made. A detail of State police surrounded the plant at all times to keep order. The strikers unanimously decided to accept the original cut of 10 per cent in wages made by the firm on October 27, with the understanding that all the men were to go back to their old jobs, and the firm accepted the proposition.

Try a Want or For Sale ad in the INDUSTRIAL WORLD.

RATE DISCRIMINATION.

Charged Against Ohio Coal Carriers in New Petition.

The Central Ohio Coal Operators' Association, in a complaint filed at Columbus, O., on December 26, before the Ohio Public Service Commission, charged the Baltimore & Ohio and Pennsylvania railroads with discrimination on coal-carrying rates. It was alleged by the association that the tariffs of these two roads for coal carrying from the Tuscarawas (O.) district are unjustly discriminatory, and the commission is asked to investigate at once and compel a readjustment of rates.

An attack will be made upon the public utilities act by attorneys of the Wheeling & Lake Erie Railroad, according to notice given the Ohio State Commission, intended to test the constitutionality of the act. The communication received by the commission from Squires, Saunders & Dempsey, of Cleveland, the railroad's attorneys, states that the action will be filed in the Franklin county (O.) Common Pleas Court.

The action will be in the form of an injunction to restrain the commission from executing its order regarding the passenger service between Neffs, in Belmont county and Adena, in Jefferson county, on a branch railroad which the Wheeling & Lake Erie controls. The commission assumes that the entire utilities act will be involved in the action, since it is set forth that many of the most important functions of the commission provided for in the act are to be assailed.

Chattanooga-Cincinnati Protest.

Civic organizations of Cincinnati on December 27, made formal complaint against alleged discriminations by the Queen & Crescent Route in freight rates against the business community of Cincinnati. Resolutions were adopted calling upon the Board of Trustees of the Cincinnati Southern Railway to forfeit its lease to the Queen & Crescent.

The resolution recites that the alleged policy of the Queen & Crescent Route is to grant lower rates on northbound shipments than on shipments to the South, particularly to Chattanooga, Tenn. As an instance, rates on bar iron, Cincinnati to Chattanooga, are given as 23 cents, as against 18 cents Chattanooga to Cincinnati; rates on stoves and ranges 34 cents southbound and 25 cents northbound; and on machinery 53 cents southbound and 35 cents northbound.

Concrete Piling Order.

Raymond Concrete Pile Company has been awarded contract for placing 36,000 lineal feet of Raymond concrete piling for foundations of the college and conservatory of music buildings to be erected for the Sisters of Providence at St. Mary's, Ind.; D. A. Bohlen & Son, architects; Bedford Stone & Construction Company, Indianapolis, general contractors.

TRADE MEETINGS

Pittsburgh Foundrymen's Association.

The regular monthly meeting of the Pittsburgh Foundrymen's Association will be held at the Carnegie Technical School to-morrow (Tuesday) evening, January 2, at 8 p. m., through the courtesy of Prof. C. B. Connelly, dean of the school. The subject for the evening will be a lecture by Henry Cave, president of the Autogenuous Welding Equipment Company, which will be illustrated with lantern slides. There will also be a practical demonstration of this machine in the foundry at the school.

Structural Section of Engineers.

The annual meeting of the Structural Section of the Engineers' Society of Western Pennsylvania will be held in the society rooms, Oliver building, Pittsburgh, Tuesday evening January 2, 1912. R. B. Woodworth, engineer for the Carnegie Steel Company, will be the speaker of the evening and his subject, "Historical Notes on Structural Members."

The paper is a discussion of inventions as reflected in the rolling of beams and the fabrication of girders, it will be presented under the following heads: A, the actual manufacture of beams and girders in cast iron, wrought iron, and steel. B, beam design as reflected in patents.

CUSTOMS DECISIONS

Machine Parts.

The final outcome of a case pending before the board of general customs appraisers will be of great importance to domestic manufacturers of machinery. Importers of fully finished parts of machines are seeking to take advantage of a clause in the tariff act so as to introduce such fully finished parts, if made of cast iron, at the low duty of one cent a pound as machined iron castings. If the contention is upheld it will then be possible to import entire machines at this rate, providing the imports are divided into several shipments.

A hearing in the matter was held by the board of general appraisers on December 29. Thomas J. Doherty represented the Department of Justice in the proceedings.

"Unusual" Cylindrical Coverings.

On account of the recent disputes over

cylindrical coverings of metal imported at the port of New York the decision of the Board of Customs Appraisers last week in the case of cylindrical coverings of part metal is of interest. The board decided that the part wood and part metal cylindrical coverings are to be regarded as unusual coverings and dutiable at 30 per cent. The importers contended that the containers are the usual coverings for the merchandise which they contained.

PERSONAL

H. W. Reisinger, 68 Fidelity building, Pittsburgh, has been appointed local agent for the National Meter Company, New York, in the sale of Nash gas engines.

V V

William S. Dickson, general foreman of the Cincinnati Planer Company, has been chosen successor to John M. Manley as secretary of the Cincinnati Metal Trades Association and the Cincinnati Association of Foundries. The salary is about $3,700 a year, and the duties of the position center about an employment agency for the metal trades industries of the city. Mr. Manley assumes his new duties as civic secretary of the Business Men's Club of Cincinnati to-day.

V V

H. Kleinhans, who was formerly identified with the American Locomotive Company, has opened an office in the Oliver building, Pittsburgh, and will engage in business for himself as a dealer in railroad and contractors' equipment, engines, electrical machinery, etc.

V V

The Elk Fire Brick Company, St. Marys, Pa., tendered its first annual banquet and ball to its employes December 30.

V V

Robert Porter has been appointed superintendent of the plate and merchant mills at the Lansingville works of the Republic Iron & Steel Company, succeeding H. J. Steinbreder. Mr. Steinbreder recently resigned to become connected with the Laclede Steel Company, of St. Louis.

V V

Samuel P. Adams, general manager of the Portsmouth Fire Brick Company at the time of its absorption by the Harbison-Walker Refractories Company, is now affiliated with the Pyro Clay Products Company, Oak Hill, O. Mr. Adams' father was the founder of the Portsmouth Fire Brick Company.

Damages Against Supply Company.

The Eagle Glass & Manufacturing Company of Wellsburg, W. Va., won its suit in the Circuit court at Parkersburg against the Second Hand Pipe & Supply Company, of Parkersburg, based upon the claim that the defendant sold it pipe not up to specifications. The jury awarded the plaintiff $4,863.23.

FENDER EQUIPMENT AT THE PANAMA CANAL.

The Isthmian Canal Commission has announced the award of a contract to the Railway Steel Spring Company for furnishing helical springs for use in the fenders for the lock approach walls. Eight bids were received, and the lowest for 53 cents a spring, total of $13,572.24, was accepted. The total number of springs contracted for is 25,608 and their total weight, 640,200 pounds. Each spring must be 12¼ inches long when free, 9¼ inches when loaded, 3 1-16 inches inside diameter. The free height must not vary more than ⅛ of an inch from the height specified.

The award of the main contract for these fenders to the United Engineering & Foundry Company of Pittsburgh was announced by the INDUSTRIAL WORLD three weeks ago (Dec. 11, Page 1482). The fender equipment was described by this paper in the issue of October 23.

Of the award of the main contract, to the United Engineering & Foundry Company the "Canal Record" says:

Award has been authorized for 48 machines for lifting and lowering the fender chains in the locks, to the United Engineering & Foundry Company for $428,005, the lowest of ten bids received. The next lowest bid was $490,226.87 and the others varied between this and $819,800, the highest. The first or sample machine is to be delivered within 120 days from the date of award, and if it proves satisfactory, the full award of 47 more machines will be made. The deliveries on the final award are with 210 days at Gatun, 240 days at Pedro Miguel, and 300 days at Miraflores.

"The contract includes, besides the machine to lift and lower the chains, castings for hawse pipes, structural materials, operating valves, piping and fittings, and mechanism for starting and stopping the pumps. It does not include the main pumps, motors, electrical machinery and wiring, the fender chains themselves, suction tanks, drainage pumps and motors, and riveted steel anchorages for attaching to hawse pipe castings.

"The function of these fenders is to prevent the lock gates from being rammed by a ship that may approach too near under its own steam, or by escaping from the towing locomotives."

ELWOOD (IND.) MILL.

Rumored Enlargement in Capacity.

It is reported at Elwood, Ind., that the management of the American Sheet & Tin Plate Company, which has spent $85,000 in improvements during the past year at the Elwood mill, will spend $55,000 more in addition for better machinery.

During the last 10 months the Elwood mill has advanced from ninth to fourth place among the company's tin plate plants in point of production and the heavy expense in new machinery is expected to advance the mill still more.

It is stated at Elwood that the proposed tin plate equipment in the company's Gary, Ind., plant, which is now entirely a sheet steel and jobbing mill proposition, will not be installed for at least two years, during which period Elwood will be expected to supply that district.

Barge Canal Harbor at Ithaca, N. Y.

A petition from citizens of Ithaca, N. Y., asking that a barge canal terminal harbor be established at that city was last week taken up by the State Canal Board, and as Superintendent of Public Works Treman favored the proposition the board empowered State Engineer Bensel to prepare plans and specifications for the terminal.

TILL FEBRUARY 1 TO ANSWER.

Further Stay Is Granted in Steel Corporation Dissolution Suits.

Attorney-General Wickersham has consented to a further postponement until February 1 of the time for filing answers in the government suit in court at Trenton, N. J., asking for dissolution of the United States Steel Corporation. The answer under the original proceedings would be due to-day (Monday), but the government had already consented to a postponement as to a number of the defendants, particularly the Minnesota Mining & Land Company, until January 15.

The postponement until February 1 was asked for by Lindaburg, Depue & Faulks and Sullivan & Cromwell, as counsel for the United States Steel Corporation itself, J. P. Morgan, Andrew Carnegie and a number of other individuals and corporate defendants. Inasmuch as the government has consented to postpone the time until February 1, in some of the cases it is anticipated that all the defendants will ask for similar extensions of time and that there will be no further steps in the litigation before that date.

HEAVIER ROADBEDS MAY BE NECESSARY WITH MASSIVE NEW ROLLING STOCK.

EXTRAORDINARY CALLS FOR REPLACEMENTS IN TRACKS AND BRIDGE TO FOLLOW PRESENT CAR BUYING MOVEMENT—NEWS OF THE RAILROADS AND RAILROAD BUILDERS.

The putting out of specifications by the Pittsburgh & Lake Erie for heavier passenger and coal cars and by the Pennsylvania for a new and massive type of steel freight car, has encouraged makers of track equipment in this district to believe the railroads are on the verge of a campaign of heavy track material buying.

It is believed the new type cars and locomotives in contemplation or under contract by the New York Central, Pennsylvania and other trunk line systems will call for heavy expenditures in the improvement of bridges, rails and other features of the roadbed.

The ordinary coke car now in use has a capacity of 80,000 pounds. Many of the older type cars will be strengthened to enable them to make heavier hauls. They will be provided with heavier trucks and otherwise strengthened so as to permit them to carry a 100,000-pound load, if necessary.

The Pennsylvania railroad, it is understood, is contemplating double-tracking the Ohio river connecting bridge. When this work is done the bridge will also be strengthened to care for the heaviest type of car constructed, although there are no restrictions upon it at present. The Pennsylvania also has submitted specifications for bids on 17,000 steel cars of the heaviest type. These orders, when placed, will require several years to fill.

Buckhannon & Northern Construction.

Track has already been laid from Martin, the present terminus of the Monongahela railroad to make the Pennsylvania connection with the Buckhannon & Northern railroad in West Virginia. This section of the road is being completed before work is started on the Greene county (Pa.) side so that the structural steel to be used in the new bridge can be shipped from Pittsburgh by rail.

Work on the bridge is progressing more rapidly than had been predicted by the engineers in charge. Thousands of cubic yards of concrete have already been constructed. The total amount of excavation and embankments involves an excess of 250,000 yards. The work in Fayette county will probably be finished about February 1. The bridge proper will be erected by the American Bridge Company, which is also furnishing the steel for the Georges and Dunkard creek bridges.

McMennamin & Simms, the general contractors, have sublet the work in Greene county to Zevely, Donovan & Moore, of Morgantown, W. Va.

To Enlarge Track Pans.

A recent decision of the operating department of the Pennsylvania Railroad to use four engines instead of three on eastbound trains between Conemaugh and Gallitzin, Pa., has made it necessary to increase the length of the track pans in the two eastbound tracks at Wilmore from 1,800 to 2,600 feet. The work of extending these pans is under way. The water location is 12 miles east of Conemaugh and 12 miles west of the summit of the heavy grade against eastbound trains coming from Conemaugh. It is probably the largest individual water station in the country. Over 2,250,000 gallons of water are used there daily.

Trolley Fender Complaint.

Before the Pennsylvania State Railroad Commission at Harrisburg Pa., last week, in answer to the complaint of W. F. Dagle, of Mount Holly Springs, that the Cumberland Valley Company operates cars without fenders, the company replied that there is no requirement in the franchise granted it by the borough of Mount Holly Springs providing for the installation of the safeguards.

Indiana Headlight Order Void.

That the order of the Indiana Railroad Commission requiring companies to equip their locomotives with headlights of not less than 1,500 candle power is void, because it is indefinite and uncertain, was the decision made in Federal court at Indianapolis December 27, in the suit of the Baltimore & Ohio Railroad against the commission.

The special master, however, holds that it is within the power of the commission to issue such an order.

If the report is sustained by Federal Judge Anderson an injunction will be issued.

N. Y. Central Viaduct at Youngstown.

It is announced that engineers in the employ of the Lake Shore Railroad Company were in Youngstown, O., last week, drawing plans for the proposed bridge over the Oak street grade crossing. It is understood that the Lake Shore Company is in favor of the improvement and has set aside $25,000, its share of the expense of the structure.

City Engineer Frank M. Lillie has urged on the railroads, whose tracks the bridge will span, the necessity of such an improvement.

Railroad Bridge at Memphis.

A bridge will be constructed across the Mississippi river at Memphis, Tenn., by a company, a charter for which was filed at Memphis on December 25, working in connection with the Rock Island. Though the railroad or any one known to be connected with it are not named in the application for charter, J. T. Harahan, former president of the Illinois Central, announced the company would be interested and would spend $10,000,000 in the project and in building new terminals here.

It is understood Mr. Harahan will be made president of the bridge company, which will be known as the Memphis Railway Bridge & Terminal Company.

Names attached to the application for charter filed with the Shelby county register are: J. T. Harahan, J. T. Reichman, C. Hunter Raine, E. E. Wright and E. L. Mallory, all Memphis men.

Gasoline-Electrics to Australia.

The McKeen Motor Car Company, Omaha, Neb., has recently shipped two 70-foot, 200-horsepower gasoline motor cars to the Victorian Railways, Melbourne, Australia. The shipment required five flat cars for transportation to Tacoma, where it will be shipped via the Frank Waterhouse line. The two boxes containing the car bodies were 70 feet long, 11 feet wide and 10 feet high. They are said to be the largest boxes ever shipped in the history of rail or water transportation. The cars are adapted to the Victorian Railways, which have a five-foot three-inch gauge.

Use of Creosoted Ties by Lackawanna.

By the end of 1911, the Lackawanna Railroad had placed 493,507 creosoted railroad ties, twice as many tie plates and four times as many screw spikes on its system.

The road claims that laboratory and field tests have shown that screw spikes in an oak tie treated with creosote has

PRINCIPAL STEEL CAR ORDERS OF THE WEEK.

ILLINOIS CENTRAL—500 box cars, American Car & Foundry Company.

PITTSBURGH, BESSEMER & LAKE ERIE—2,000 ore cars, Pressed Steel Car Company.

ROCK ISLAND—2,500 steel underframe cars, Pullman Company.

an excess holding power over the nail spike of 88.1 per cent. The holes are first bored in the ties at the proper spacing to receive the spikes and the former are then sent to treating retorts where creosote oil is forced into the cells of the wood under pressure of 175 to 200 pounds per square inch.

WESTERN MARYLAND.

Tunnel Through Savage Mountain Opened—Car Requirements.

Christmas morning the workmen met in the center of the Big Savage Mountain tunnel, 3,600 feet long, being built in connection with the Western Maryland extension from Cumberland, Md., west.

The Western Maryland has authorized an issue of secured notes to the amount of $10,000,000, of which $8,000,000 are to be presently issued and have been sold.

The notes are to be dated January 1, 1912, and mature July 1, 1915. The proceeds of the notes are to be applied in the acquisition of equipment, expansion of terminal and yard properties and generally the enlargement of the facilities of the company so as to enable it to handle with economy and despatch the increasing volume of business tributary to its own lines, as well as the additional traffic which it is expected will result upon the opening of the company's Pittsburgh connection.

As soon as specifications can be prepared, the Western Maryland will enter the market for new equipment and motive power, which when purchased will represent an expenditure of considerably over $2,000,000.

The new equipment to be purchased is as follows: Fifteen consolidation freight locomotives, 10 Pacific passenger engines, 2,500 freight cars of various designs and 36 passenger coaches, including mail, express and baggage cars.

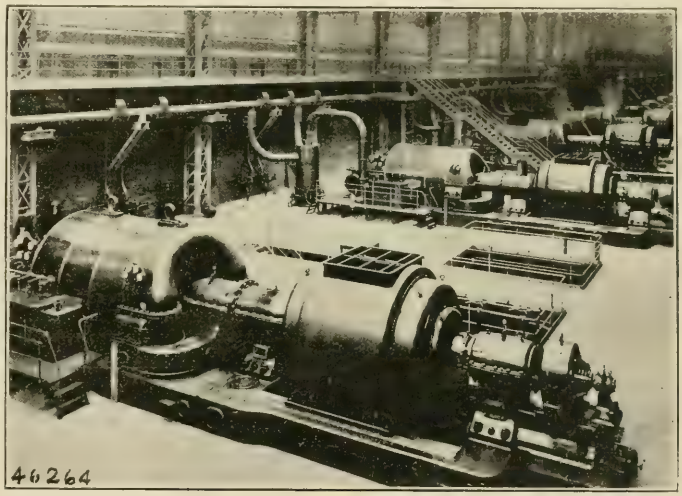
Railroad to Build Cold Storage?

Publicity was given in Pittsburgh last week to a report that the Bessemer & Lake Erie Railroad has completed plans for the erection of a market house and cold storage plant at its East Pittsburgh (Pa.) terminal, where consumers and merchants will be enabled to buy direct from farmers and producers, thereby eliminating the middleman. If the plan works successfully, market houses will be erected at various points along the Bessemer route and fast freight services will be established. E. H. Utley, general manager of the Bessemer road, stated that there had been talk of the venture, but would not discuss any of the details.

WESTINGHOUSE INSTALLATIONS OF POWER EQUIPMENT FOR LONDON COUNTY TRAMWAYS.

RECENT agitation over power station equipment in this section makes a description recently sent out by the Westinghouse interests of power equipment installed by the London County Council for its tramways of especial local interest.

What is known as the London County Council tramways consists of what was formerly a number of independent tramway undertakings operating within the county of London, together with certain new lines subsequently built by the council. Each of these companies owned from 4 to 50 miles of line—but gradually the council has taken over by purchase all the tramway companies within its area. The first transfer took place in 1895 and the last in 1909.



Two 5,000-Kw. impulse high pressure turbo-alternator sets at Greenwich power station, London.

At the end of March, 1910, the system extended over 135½ street miles, of which 115½ miles were electric lines. The remaining 20 miles were at that time still worked by horse traction, but the latter have now practically all been converted to electricity.

The total capital outlay of the London County Council Tramways amounted on the 31st of March last to about $50,000,000. A report recently presented to the council showing the results of the year's working during 1909-1910 gave the gross receipts of about $10,125,000 on the horse lines, viz., approximately $225,000, leaving a net surplus after payment on interest on capital outlay and for replacement of debt, of $960,000. The number of car miles run was 42,160,186, and the number of passengers carried 451,439,216.

The growth of traffic has arisen not merely from the increased mileage but also from the increase in the length of the routes electrified. Horse cars have only a small carrying capacity and low-speed, and in London they are entirely at the mercy of the competition of motor omnibuses. Hence electrification in London has produced even more startling increases in the number of passengers than is the case in other towns.

GENERATING STATION.—The electric generating station for the whole of London is situated at Greenwich, close to the river Thames. It was erected in two sections, and the site covers an area of approximately 3¾ acres.

The plant includes four vertical horizontal reciprocating engines coupled to three-phase alternators, of 3,000 kw. capacity each, four 3-phase turbo alternators of 5,000 kw. capacity.

Two of the latter have only recently been installed. They were manufactured by the British Westinghouse Electric & Manufacturing Company, Limited, of Trafford Park, Manchester. An illustration of one of these sets appears herewith, in the foreground of the accompanying view.

The two sets each comprise one 5,000 kw. 750 r. p. m. high pressure Westing-

house impulse type turbines coupled to one 5,000 kw., three-phase 25-per., 6,000-v., alternator, complete with Leblanc surface condensing plant and Leblanc auxiliaries.

The official tests of No. 7 turbine took place on the 8th, 11th and 13th of January, 1911, after it had been eight months in regular service. This turbine has recently been opened for inspection after having been in operation for over 12 months, and it is found that the closest examination shows no trace whatever of corrosion, the blading being perfectly clean.

The normal plant capacity of the Greenwich generating station is 34,000 kw. The current is generated at a pressure of 6,600 volts, and is conveyed to various sub-stations over the tramway area.

The sub-stations are provided with motor generators and rotary converters of a total capacity of 45,750 kw. transforming the current from alternating to direct at a pressure of from 550 to 600 volts.

The current is sent in the usual way from low tension switchboard through feeder cables into the conductor rails in the conduit at half-mile intervals. On the overhead wire section the usual feeding arrangements for trolley wires are in use. The switches on the feeder panels in the sub-station allow of the conductor bars in the conduit being changed so that either may be positive or negative as required for the purpose of dealing with leakages to earth.

Hamilton Car Line Extension.

At Hamilton, O., Kelsey Schoepf, president of the Ohio Electric Railway Company, advised the Chamber of Commerce that he will shortly confer in regard to extending the car lines to Prospect Hill, a fine residential section of the city. The citizens have subscribed a large fund to get the extension.

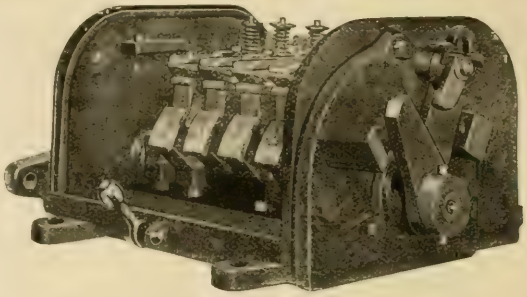
Extend Mexican Railroad.

President Madero, of Mexico, has granted to a syndicate of Seattle men a concession to build three hundred miles of railroad, which will connect Acapulco with the City of Mexico. The syndicate already has under construction 120 miles of track and the line to the capital will be an extension of the road now being built. The grant calls for completion in six years.

Rail Record at Steelton.

The rail mill of the Pennsylvania Steel Company made a record in rolling open hearth rails for the week ended December 24, when the tonnage rolled averaged about 1,000 tons a day. In one 12-hour day 553 tons were rolled.

PITTSBURGH MAN'S IDEAS EMBODIED IN NEW SAFETY LIMIT STOP SWITCH FOR ELECTRIC CRANE.



Cutler-Hammer Palmer Safety Crane Limit Stop.

IN electrical hoist or crane service a limit switch to prevent over-travel of the hoist block is necessary to insure against serious accidents. Those experienced in crane service realize the inefficacy of the ordinary limit switch which merely opens the motor circuit. The stopping point varies considerably and if the limit is set low enough to prevent dangerous over-travel when the hook is light and coming up at high speed, a loaded hook at slow speed will stop below the desired point. An adjustment that suits one condition is not satisfactory for all. The Cutler-Hammer Manufacturing Company of Milwaukee, has brought out the Palmer Safety Limit Stop shown in the accompanying illustration. This limit switch, which embodies the ideas of L. R. Palmer, safety engineer of the Jones & Laughlin Steel Company, Pittsburgh, will bring the block to rest within two inches of any given point, regardless of load or speed. The trip rope used with this device is independent of the hoisting ropes (replacing the latter does not require adjustment of the switch as with other limit stops). Tripping the switch not only opens the motor circuit as with other types but establishes a dynamic braking action by connecting the series field across the armature. The motor is brought to a stop promptly. This limit stop is made in capacities up to 25 horsepower 110 volts and up to 50 horsepower 220 and 550 volts.

WESTINGHOUSE MERGER TALK.

Rumors of Alliance of the Electric and Machine Are Revived.

News ticker wires last week carried hints at the revival of the plan proposed a year or two ago for an alliance of the Westinghouse Electric & Manufacturing Company and the Westinghouse Machine Company, practically merging the two corporations which are claimed by the electric interests to be so closely affiliated, that they should be under one management. The electric company, however, is controlled by Eastern capital and the machine company is still dominated by the original Westinghouse interests. Negotiations, it was said last week, had been entered into and are remaining in statu quo, pending a more favorable time.

From what officials of the companies say the plans are not new, but the basis for them appears to be not entirely satisfactory to Mr. Westinghouse. The machine company owns patents and controls the larger output of steam turbines both for power and marine purposes, and with the ownership also of the reduction gear appliances for marine turbines, it is in a position to develop rapidly into one of the most extensive builders of marine equipment in the world. The other engine building business of the company is largely gas engines.

In the selling of electric generators and electric power machinery, the two companies have always worked together, and jointly build such plants. The separation of the two companies through the reorganization of the electric interests has brought about a peculiar relation and some difficulties are said to have arisen that have stimulated the move for a merging of the interests.

Officials of both concerns say that the plans are not being pushed at present but that ultimately some steps are likely to be taken that will result in benefit to both corporations. That any ill feeling exists between the two companies over the matter is denied absolutely by persons close to the management of the electric company.

HOLLOW-TILE SILO SHIES ITS CASTOR IN THE RING.

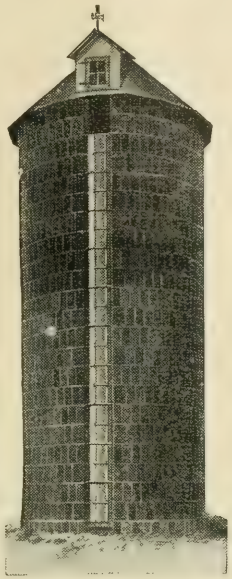
FOLLOWING the exploitation of the concrete silo, for farm work, by the Universal Portland Cement Company, and the "boosting" of several types of iron plate and sheet steel silos by various iron and steel companies, the leading fireproofing interest of the country has joined the merry competition with a hollow tile silo. And each company claims durability and cheapness for its product.

The National Fireproofing Company, of Pittsburgh, is out with a formal announcement of the organization of an agricultural department for the manufacture of an imperishable tile silo and has placed E. H. Baker at its head. The announcement states that the company recently secured valuable patent rights consisting of an interlocking device, which clamps the blocks together, and expects to turn out sufficient material to construct thousands of them, during the coming year.

The National believes the new product is destined to replace the stave silo, since tile silos can be built cheaper than the wooden ones and need not be painted yearly, as when wood is used. So far as cost is concerned, they can be built cheaper of tile, it is claimed, than by the use of any other material. The interlocking blocks are said to be the most scientifically constructed of anything yet invented in hollow block construction. in fact it is said that while the statement may appear exaggerated, the interlocking device is strong enough to be used as a standpipe for a waterworks.

The constructon also is said to be so simple that almost any one can erect them. It is no task at all for a brick mason. The block used is 8x8x16 inches and weighs about 35 pounds. The blocks are grooved on the sides so as to hold cement mortar, which, when it hardens, strengthens the structure. The clamp is of the same vitrified material as the block, and is about 5x5x3 inches and weighs 3½ pounds. Each of these clamps ties two blocks together and extending up into the block above securely prevents that block from moving. The clamp extending into the block above is nearly large enough to fill the opening, and a little mortar dropped around the sides makes it solid.

The silo is not an experiments; the farmer recognizes that he cannot feed his stock to the best advantage if he figures without ensilage. The idea of the silo is to enable the farmer to feed June fodder to his stock in mid-winter. By this means he preserves the juicy green corn stalk and the sweet grass of early summer, and feeds it out in the following



winter in the form which will at once be inviting to his stock. In fact it is said that farmers have learned from experience that an acre of corn placed in a silo is worth two in the field. Silos are built from 24 to 48 feet in height, and from 10 to 20 feet inside diameter. They hold from 24 to 325 tons according to the size.

Mr. Baker, the new head of the Agriculture department, who was raised on a dairy farm near Morenci, Mich., has given much attention to silo building since he had two silos on his own farm, one a cement and the other a stave silo; but his experience with them was not satisfactory until finally he hit on the tile one and it appealed to him at once, since he contended the tile silo was the only air tight one that could be satisfactorily built. All of the blocks used are made of vitrified clay. The weather will not affect the clay blocks, and, being hollow, they do not absorb moisture as happens in the use of concrete exclusively. It is asserted by the National Company that no material stands all weather conditions like vitrified clay. It is held that architects recog this fact, for all of the skyscraper buildings that are built to endure have their exposed surfaces faced with vitrified brick or terra cotta hollow tile, which is another vitrified product and like the other tile, fireproof.

Try a Want or For Sale ad in the INDUSTRIAL WORLD.

PASS ON ARMOR PATENTS.

Krupp Cases in Supreme Court.

The Supreme Court of the United States has been asked to pass on the validity of the Schmitz and Ehrensberger patents on the Krupp process for making armor plate. John R. Sheffield, of New York, attorney for the Krupps of Germany, filed with the clerk of the Supreme Court on December 23 a petition for a writ of certierari to the circuit Court of Appeals for the third circuit to review the decree by that court affirming the judgment of the United States District Court for the eastern Pennsylvania district dismissing bills asking for injunctions against the Midvale Steel Works.

The patents involved are four in number and were granted to Schmitz and Ehrensberger, German subjects, who in turn signed them to the Krupps. The petitioners claim that the process covered by these patents represents the latest improvement in making armor plate, surpassing the Harvey process; that the governments of the world have recognized it and that even the United States government has specified in its contracts for armor plate that the "Krupp process" be used. The process is for carburizing and face-hardening armor.

The court below in dismissing the petitions for injunctions held that certain claims in the patent were invalid and that the others were not infringed.

OHIO COAL SOLD.

Grand Trunk Railroad the Buyer.

The Grand Trunk railway has bought 31,000 acres of coal land in Belmont county, Ohio, including six operating mines with a capacity of 750,000 tons of coal annually, from the Rail & River Coal Company, of Pittsburgh. Purpose of purchase is the shipment of coal for use along its own lines.

Price paid by Grand Trunk is stated to be $3,000,000, and the railroad company has guaranteed the bonds of the Rail & River Coal Company, there being $2,500,000 of these outstanding. Capital stock of the coal company is likewise $2,500,000. It is stated that purchase was made to complete consolidation of 48 mining companies in Ohio.

Lisman & Company, of New York, are underwriting the stock, and it is said they represent capitalists of London and Amsterdam who are planning a $30,000,000 consolidation of coal companies, the output of which would be 13,000,000 tons of coal annually. F. J. Lisman, of the firm of Lisman & Company, confirms the sale of 31,000 acres of coal land and mines to the Grand Trunk, but denies the report of a $30,000,000 consolidation.

NEW PLANT OF BEST MANUFACTURING COMPANY, AT OAKMONT, PA.

UNUSUAL FEATURES OF ONE OF PITTSBURGH'S NEWEST SUBURBAN ESTABLISHMENTS—DETAIL OF COMPLETE AND MODERN EQUIPMENT IN FOUNDRY, MACHINE AND PATTERN DEPARTMENTS—"MADE GROUND" ALONG THE LOWLANDS TO FURNISH ROOM FOR EXPANSION OF PLANT.

OAKMONT'S newest factory, some 12 miles up the Allegheny river from Pittsburgh, the new plant of the Best Manufacturing Company, devoted to the manufacture of valves, pipe fittings, pipe bends and special castings—is illustrated in the accompanying views. The plant has been occupied for some months by the company, but is here described in detail for the first time.

The ground occupied by the plant lies between the tracks of the Pennsylvania Railroad and the bank of the Allegheny river and is served by a spur track and by its own special station, Edgewater.

The property owned by the company (Fig. 2) is shown enclosed by the light lines; at the present time the part enclosed by the heavy lines, which represents the fence surrounding the plant, is in use, as well as a section to the north of A street, where a group of houses has been built for the workmen, and a rest house and athletic field provided.

Materials come in and finished products go out over the spur to the railroad, the terminals entering the pipe yard, the foundry stock yard, the machine shop and the foundry, as shown on Fig. 2. From the foundry stock yard the raw material, such as coke, pig iron, limestone and so forth, pass to the charging elevators for the cupolas which are located about the center of the foundry. Lumber for patterns, after storage in the shed provided for that purpose until it is partially seasoned, is passed to the drying kiln for completing the process.

Room for Much Filling.

All parts of the plant proper are established well above high water mark. The property outside the fence, however, is at a lower elevation, affording a place for the disposal of foundry refuse for many years to come. Besides the main switch tracks, an industrial railway is provided for the handling of heavy material on truck cars, and this, supplemented by plentiful provision of cranes, enables the handling of heavy pieces quickly and at a minimum of expense.

As seen from the general plan of the plant, the main buildings are the machine shop and the foundry, which are placed at right angles to each other. At the east side of the machine shop is the pipe yard and pipe storage shed with the office building at the south end. On the north and west sides of the foundry is the yard for the storage of flasks. Also on the north side of the foundry are located three pattern storage buildings. On the south side of the foundry is the stock yard for storage of raw material, with the power house beyond. The lumber shed is located southeast of the ma-

Fig. 1—Birdseye view, Best Manufacturing Company's New Plant at Oakmont, Pa.

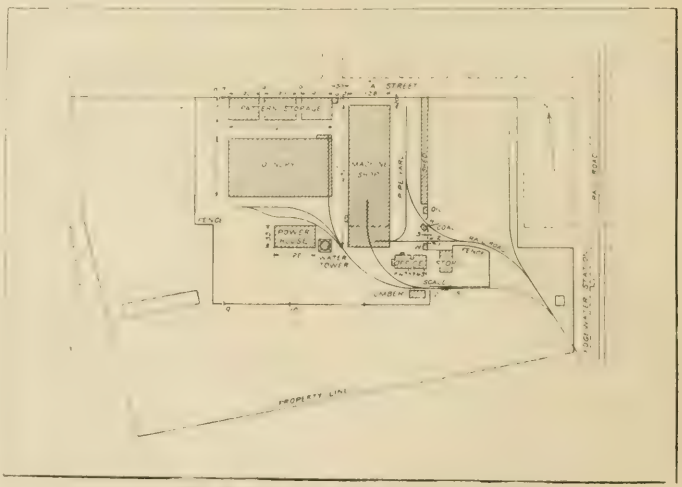


Fig. 2—General arrangement of the works.

chine shop, and to the east of the building is located a small storage building for supplies and tools.

General Dimensions.

It is seen that the arrangement is thus most convenient for the handling of work. Patterns and flasks come to the foundry from the side next the moulding floor, while the stock for the cupolas is located on the side of the foundry nearest them. The cleaning room for castings is in the end of the foundry next the machine shop, and the castings are taken direct to the main bay of the shop where they are stored until needed for machining, or to the casting storage section in one corner of the shop. Cars are shunted about the plant as may be needed, and are loaded in the machine shop or foundry by overhead traveling cranes. The size of the plant can best be appreciated by reference to the figures on the plan of arrangement, Fig. 2. The machine shop is 432 feet in length by 128 feet in width; the foundry 320 feet in length by 176 feet in width, and the power house 128 feet in length by 55 feet in width.

Machine shop, foundry and power house are all of the most modern steel frame construction with brick curtain walls and cement tile roofs on steel trusses. They are provided with exceptionally high windows, giving splendid lighting at all points in the buildings.

Foundry.

At the north side of the grounds are three corrugated steel pattern sheds, each having three floors, for the storage of patterns. The lower floor is arranged for the heavier patterns and above are racks, three shelves to a rack, all properly arranged according to size and each one card indexed so that its position can be specified on any job ticket. The distance from pattern shed to foundry is comparatively short, 60 feet, and between the foundry and these sheds is the flask storage yard with industrial track leading from the yard into the foundry, and turntables enabling any flask or pattern to be transferred easily and quickly to any part of the foundry. The foundry is arranged in three bays, that on the north side being devoted to the cleaning of castings, the repair and alterations of flasks and the moulding of the smaller patterns. In the center bay is the location of the floor moulds where large pieces are cast; and in the south bay is found at the west end a space for small valve castings; in the middle the cupolas and at the east end the core room. On the mezzanine floor back of the cupola is the chemist's laboratory. On the second floor is the charging platform, and west of this is located the brass foundry.

Equipment of the foundry is very complete, moulding machines being used wherever they can be of advantage, metal flasks being provided and specially shaped to the patterns for standard work, and metal core boxes for the smaller work.

At all points cranes are installed for the convenient handling of heavy patterns, cores and flasks, and for the moving of castings. That in the core room is a 5-ton girder crane, made by the Morgan Engineering Company, while over the pit and loam floor are a 15-ton and a 30-ton girder crane of the same make, and along the side of this floor next the cupolas are two 5-ton jib traveling cranes to serve the ladles and handle the lighter local traffic. Over the north bay are a 10-ton Morgan and a 10-ton Whiting crane.

In the floor moulding for large special castings, the lower half is moulded in

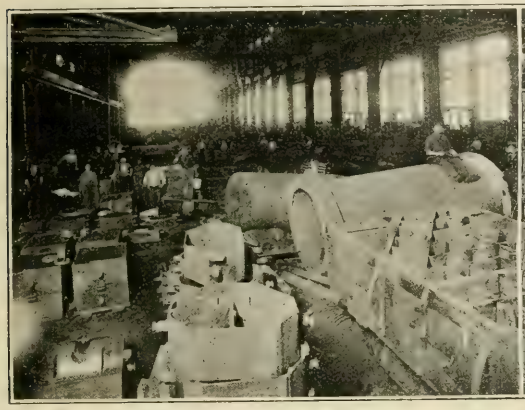


Fig. 3—Mould floor in foundry.

Fig. 4—Central bay, foundry.

Fig. 5—Athletic field and rest house house connected with the works.

the floor, as shown in Fig. 3, where a big 2-nozzle elbow is in course of construction, while a big flask is used for [illegible]

Loam molds and swept-up forms are used for large pipe and other castings, this work all being done in the center bay, and being of necessity hand work, since no two pieces are alike.

In the north bay are made the moulds for the smaller castings and standard fittings. Tabor compression machines, roll-over machines and jarring machines are all in use with standard patterns, flasks and facing boards, to secure rapidity and accuracy. Flasks are shaped specially to fit the patterns in order to give a firmer mould and also to save in the amount of sand needed.

The flask altering shop at the west end of the north bay is provided with a swing cut-off saw, a rip saw and a drill press, each driven by an individual motor.

At the east end of the north bay castings are cleaned by means of hand work, pneumatic chipping hammers, tumbling barrels and the sand blast.

The two cupolas in the south bay have capacities of 12 and 30 tons per hour, and are charged from a second story floor served by a hydraulic plunger elevator. On this floor is also located the brass foundry, where castings are made for small valves and the brass parts of the large valves; also the Monel metal castings. Schwartz furnaces are here used, supplied with oil fuel and air blast, and arranged like Bessemer steel converters, to tilt and deliver their charges into the ladles.

Between the cupolas and the core room are three large core ovens. These are heated by natural gas (with an arrangement for coke firing in an emergency), and are served by the 5-ton crane which runs over the core bay; also the trucks from the ovens can be run out far enough to reach under the cranes in the main bay. In the manufacture of the "Best" products the core oven is a very important feature, for it is a prime necessity that the core shall be exactly right and of proper temper. For some of the smaller castings a green sand core is used, but for the complicated shapes and for all of the larger work the core must be carefully baked to the right degree [illegible]

Machine Shop.

Location and dimensions of this building are shown on Figure 2, the part to the north of the dotted line being used for machining operations and that to the south for pipe bending and peening. Material comes in from the foundry and is deposited in the storage space for castings, either in the middle bay or in the northwest corner. Flanges travel along the north end of the shop, first to the boring and tapping machines, then to the facing lathes, then to the drill presses and on to stock. Large fittings and valves and special castings are taken care of on the boring mills, planers and lathes. Small valve bodies are machined on turret lathes next to the boring mills.

Smaller parts and fittings are taken care of on the lathes on the east side of the shop. All valves are assembled on the fitting floor in the northeast corner. From here they are taken to the testing press and then go to storage, the larger valves on the stock space on the floor and the smaller ones in the stock bins in the gallery.

Electric drive is used throughout, the larger tools having individual motors and the smaller ones being driven in gangs from counter-shafting. Main shafts and the counter-shafting are supported from the steel columns so as to be clear in the main bay, and to permit of belting to both main and side bays easily. Some of the tools in the equipment are a big open side planer, a vertical and a horizontal boring mill, which are majestic in their size, a bank of smaller boring mills, turret lathes, and ordinary lathes, large and small tapping machines, double-head facing lathes, multiple-spindle drills, single drills, a gang of pipe threading machines, and other special tools.

The lathes are of various makes, some from the New Haven Manufacturing Company, of New Haven Conn.; some from the Pond Machine Tool Works, of Plainfield, N. J., and some from the R. K. LeBlond Machine Company. Small boring mills are of the make of the Betts Machine Company, of Wilmington, Del.; multi-spindle drills from Manning, Maxwell & Moore, tapping machines from Baker Brothers; drill presses from the Niles-Bement-Pond Company works, in Philadelphia, and from the works of Prentice Brothers Company, Worcester, Mass., and radial drills from the Prentice Brothers, and from the Niles-Bement-Pond works, at Ridgway, Pa. The big boring mills and the planer are from the Niles Tool Works, of Hamilton, Ohio, and the open side planer from the Detrick & Harvey Company, of Baltimore.

Particularly interesting are the jib cranes, supplied with a two-ton electric hoist, made by the Shepard Electric Crane & Hoist Company, one of these cranes being supplied to serve each of the larger tools, and one for two or more of the smaller tools. A 3-ton girder crane also runs over the assembling and small lathe department in the north end of the east bay. The main bay is served by a 5-ton, a 10-ton and a 15-ton Morgan electric overhead traveling crane. The pipe shop has a 15-ton crane of the same make and description.

Far overhead, above the cranes, is placed a row of flaming arcs, which, with their intense light, give general illumination for the main bay, while at each individual tool is an incandescent on a flexible cord and a support of pipe or iron rod which can be moved to bring the light to any position desired, or the lamp can easily be taken off and held by hand for closer inspection. It makes a system at once simple and effective.

Hydraulic pressure for testing purposes is obtained up to 800 pounds per square inch from the lines serving the elevators, and up to 1,500 pounds from a Gould's triplex pump provided especially for the purpose. Pressures up to 10,000 pounds are obtained by means of hand pumps of special design.

The Pipe Shop.

In the pipe shop at the south end of the building are carried on the operations of making pipe bends, attaching flanges to pipe by the Van Stone and the shrinking and peening processes, and welding steel nozzles on pipe for headers.

Pipe for bends is filled with sand by gravity from an overhead hopper. The ends are then plugged, the pipe placed in the furnace, and that portion which is to be bent heated to the proper temperature. The pipe is then placed on the bending table, where, by means of an electric winch, it is bent around appropriately placed pins and forms, to give the exact curve and angle required. The purpose of the sand filling is to prevent the pipe from buckling while being bent, and after the bend is made the sand is emptied into a tank below floor level, from where it is blown upwards to the gravity hopper.

Nearby is located a smaller furnace where the ends of pipes are heated for Van Stoning. When heated to the proper temperature, the pipe is clamped in a machine and the end rolled over at a right angle to the center line. After the other end is put through same process of heating and rolling, the pipe is swung in a double head lathe and the roll-over or lap faced at exactly 90 degrees to pipe.

Near the Van Stone machine is the welding department which is principally occupied in attaching steel nozzles to pipe. The hole for the nozzle is cut out by the welding flame, and the nozzle deftly fitted to conform to surface of the pipe. The flame is then applied to the joint between the nozzle and the pipe, the resulting weld being as smooth and as complete as any made at a blacksmith's forge.

The lathe used in facing the Van Stone laps is 48 feet between heads, so that it

would be possible to face the flange on a pipe or header of that length. As pipe may be obtained in length about 40 feet long in sizes up to and including 12 inches, a further elimination of joints is possible.

For the regular fittings, solid wood patterns are used, pine being the material for special fittings, and mahogany for the standard patterns up to 10 inches in diameter; the flanges being bound with brass, and the facing plates having iron rims. Also for the standard patterns iron core boxes are used, and for sizes from ½-inch up to 2½-inch, for unions and other similar castings, metal patterns are made and generally used in gangs.

The Pattern Shop.

The pattern shop extends across the north end of the gallery and along the two sides about half the length of the shop. On each of the side galleries the machinery is installed in duplicate so that the workmen do not have to go far from any bench position that they may have to get a tool that may be needed, for sawing, planing or other operation.

In the east gallery there is also a dry kiln for seasoning the lumber by the carload after it has had a session in and outdoor seasoning shed.

Band saws, furnished by the Atlantic Works, Inc., of Philadelphia, a Watkins woodworker, which is an imported machine, able to cut out patterns of almost any shape, and a full equipment of wood working machinery, furnished by the Oliver Machine Company, form the working installation of the pattern shop. It includes lathes, trimmers, joiners, combination rip and cutting off saws, surfacers, sanders and special tools. A convenient outfit for the pattern shop is the Universal grinder made by the Mummert, Wolf & Dixon Company, of Hanover, Pa. This grinds with coarse and fine emery, and is able to put an edge on circular or flat tools, either exterior or interior. The larger tools are driven by individual motors, and the smaller ones by the grouping system from a countershaft.

Lighting is here accomplished by the use of Nernst lamps hung overhead, giving sufficient illumination without special lamps for benches or tools.

Beyond the dry kiln in the gallery is storage for finished parts and small fittings, which are taken care of in racks and piles until needed.

The Tool Room.

In the west gallery is located the tool room, where tools are made, repaired and stored. The tools are kept in labeled compartments, arranged on a very thorough system. The equipment consists principally of the following: Two speed drills made by the Niles-Bement-Pond Company, Warner & Swasey lathes, Brown & Sharpe grinder and shaper, two Hendey Machine Company lathes, two lathes from R. K. Le Blond Machine Tool Company of Cincinnati, a couple of Prentice Brothers drills from Worcester, milling machines made by the Le Blond Company and Cincinnati Milling Machine Company, shapers made by the Niles-Bement-Pond Company and Gould & Eberhart, a radial drill from the Foster & Holloway Machine Tool Company of Cincinnati, and a hollow center lathe made by the Acme Machinery Company. All are arranged with plenty of working space around them and are provided with overhead lighting by the lamps, but as the daylight is ample there is little need for artificial lighting except during the dark hours and on very cloudy days.

South of the tool room is found the brass department, devoted to the machining of unions, small valves and of brass parts entering into the construction of the large iron and steel valves.

The equipment of this department consists largely of turret lathes made by the Warner & Swasey Company, the American Tool & Machine Company and Lodge & Shipley.

An interesting process is the making of brass seat rings for gate valves from a single brass tube, by a continuous process in which the tube revolves without stopping, while by means of turret head tools and cutters the seat rings are turned, threaded and cut off as fast as the cutting speed of brass will permit.

Between the gallery and the main floor are mezzanine floors, located at each of four elevators and stairs, with toilet provisions of the most modern sanitary type and in sufficient number for all needs.

Product of the Plant.

Besides special castings on order, the output of the Best Manufacturing Company's works is largely material for power plants. The special lines are: Standard, medium, extra heavy and hydraulic gate valves of the company's own design; standard, medium, extra heavy and hydraulic fittings; special fittings of any design; pipe bends of any size or angle; large pipe fitted with special flanges, either Van Stone, peened or welded; special headers with nozzles welded on, the number, size and position of the nozzles being limited only by the area of the header surface to which they are to be attached.

Paint and varnish products were valued at $124,889,000 in 1909, an increase of $34,049,000 since 1904. In year 1909, country produced 814,500,000 pounds of pigment.

INDUSTRIAL ACCIDENTS.

German Statistics Show Carelessness to Be on the Increase There.

In a recent communication to the Bureau of Manufactures from United States Consul Robert P. Skinner ,at Hamburg, he says of a recent investigation made officially in the interest of German industrial insurance:

"The German Imperial insurance authorities have brought out the first of a series of special reports made since the enactment of the insurance laws of June 30, 1900, setting forth the effects of these laws and suggesting how accidents may be avoided successfully.

"The statistics have been worked out on the lines of the reports made in 1887 and 1897, and cover a period up to 1907, by means of specification cards covering the case of each person injured or killed for the account of whom an indemnity was paid for the first time. Altogether 81,248 specification cards were filled out, and the attempt was made for the first time to ascertain the number of full-time workingmen according to age and sex, as a means of procuring exact statistics as to the frequency of accidents.

"An interesting fact is that most of the accidents reported occurred on Mondays following the usual Sunday holiday. The time of occupation prior to the accident has been closely examined into, but no reliable proof has been brought forward to show whether or not excessive working hours have been the cause of casualties reported. Accidents caused by the negligence of workingmen themselves increased from 27 per cent in 1887 to 30 per cent in 1897 and to 41 per cent in 1907; on the other hand accidents resulting from the negligence of employers decreased from 20 per cent in 1887 to 17 per cent in 1897 and 12 per cent in 1907.

"A bill is now pending in the Reichstag supplementing existing insurance legislation by the requirement that all employes whose annual earnings do not exceed 5,000 marks ($1,190) shall be covered by life insurance policies, the German empire acting as the underwriting insurers. The bill, which excites the greatest comment, is one according to which 8 per cent of the annual earnings of the assured must be devoted to life insurance, of which the assured is to pay 4 per cent and the employer 4 per cent. Controversy relative to the merits of this bill is very general and it is probable that the measure will be amended before final enactment."

Illinois Central Repairs.

The Terre Haute (Ind.) plant of the American Car & Foundry Company has received an order for the repair of 500 cars for the Illinois Central

GOVERNMENT ESTIMATES ON COAL OUTPUT OF APPALACHIAN STATES FOR YEAR 1911.

OUTPUTS of the Appalachian coal fields in 1911 are discussed in a statement given to the press by Edward W. Parker, of the United States Geological Survey. Mr. Parker states that in general the condition of the coal mining industry in 1911 was far from prosperous owing to over-production and depressed prices.

The Appalachian region as the principal source of coking coals was more directly influenced by the depression in the iron trade in 1911 than some of the other coal mining districts. In some of the coking districts many ovens were shut down throughout the year. The production of coke in the Connellsville district decreased about 15 per cent, and the other coking districts will show a still larger falling off. There was also a lighter demand from the railroads, and as the supply of both cars and labor was adequate, there was naturally an ability to produce and transport the coal considerably in excess of the ability of the market to absorb it. It is estimated that the production of bituminous coal in Pennsylvania in 1911 decreased about 3 per cent, with a considerably larger decline in value. In West Virginia the production was approximately the same as in 1910. During the first six months of the year production fell short probably 3,000,000 tons, as compared with the last six months of 1910, but after the first of July there was some improvement in business, although prices were still depressed.

Slight Change in West Virginia.

In the opinion of John Laing, chief of the West Virginia Department of Mines, the State's coal output of the year was 54,000,000 long tons, or about 60,500,000 short tons, compared with 61,671,000 short tons in 1910. Some operators estimate that the production of the State will show an increase of about 5 per cent over that of the preceding year. Mr. Laing estimates that the production of coke in West Virginia in 1911 was not more than half as much as in 1910. This was partly made up, however, by the fact that a large amount of West Virginia coal is being shipped to by-product coke ovens in other States. For several years prior to 1911 the labor supply in West Virginia had not been sufficient for the requirements, but this was not the case in 1911. There were no serious interruptions to business owing to labor troubles, the few instances of disaffection which developed having been settled satisfactorily within a few hours after the strikes began, and the usual complaints of car shortage and the failure on the part of the railroads to handle the traffic were not made. Several attempts have been made to secure agreement among the operators by which prices could be put upon a living basis and ruinous competition abated.

Decrease in Alabama.

In Alabama according to conservative estimates, the output in 1911 decreased about 10 per cent from that of 1910. This has been due chiefly to curtailment of the production of pig iron, with a proportionate reduction in coke, and to curtailment of the output of coal from the mines of the iron-making companies. The commercial coal business of the State was anything but satisfactory. The demand was less than in 1910, and prices were greatly demoralized. Labor conditions were normal, the supply being sufficient and without interruption because of strikes. Although 1911 was so generally unsatisfactory, provision for better conditions in the future was made by the construction of two large by-product coke oven plants of Koppers ovens, one operated by the Tennessee Coal, Iron & Railroad Company, the other by the Woodward Iron Company.

Tennessee and Eastern Kentucky.

The trade conditions in Tennessee were similar to those in Alabama, and the decrease in output was about the same. The principal activity in the way of development in the entire Appalachian region was in eastern Kentucky, particularly in Pike and Harlan counties. That area will probably show an increased production over 1910.

The largest percentage of decrease in the Appalachian States was probably shown in the output of Ohio. This is due to the fact that in 1910 the production of that State had been stimulated by the strike in the Illinois and southwestern fields. The output in 1911 was between 10 and 15 per cent less than in 1910. From January 1 to June 1, 1911, the demand for coal in Ohio was very light, and in some sections the shipments were scarcely 50 per cent of the normal, while the Lake trade was 25 per cent or more below normal during the greater part of the year.

Deny New York Central Car Order.

Officials of the American Car & Foundry Company deny the report, emanating from Pittsburgh, to the effect that the New York Central has ordered 155 new passenger coaches with that company. No such order has been placed, so far as officers of the car company know.

DE-MERGED STANDARD OIL

Starts on Its Various Separate Careers on December 26.

The 35 separate companies which formerly composed the Standard Oil Corporation started on their individual careers December 26, according to a statement given out at No. 26 Broadway, New York, on that date. While the dissolution of the executive department was accomplished by the first of the month, the task of organizing operating forces for the orphans of the "Oil Trust" was not completed until December 23.

While it is too early to foretell what effect the dissolution of the big combination will have on the price of oil and other oleaginous products, it is said that the consumer probably will have to pay more for these materials before many months. Not a great deal more, perhaps it is declared, but enough to make him wonder if he really has been benefited by the United States Supreme Court. The fact that each company has had to equip a complete plant and increase the number of its employes is an additional expense, which, it is predicted, will be reflected in the future price of oil, and this is borne out by the advance of 5 cents announced during the week in Pittsburgh, where the force in the separate subsidiary offices has had to be increased and the actual office space occupied will be nearly doubled.

The task of organizing operating forces for each company was one of the most difficult that confronted the men in charge of the work. In order to accomplish it hundreds of employes have been shifted from one section of the country to the other, many men having to move their families from places where they had been for years.

Under the old combination system it was possible to have the needs of the entire group of companies looked after by a comparatively small number of men. Where one purchasing agent looked after the supplies for the entire group each company now has its own official for this work. The same rule follows in the construction department and in all the other branches.

It will take some time to ascertain whether the dissolution plan will bring about the competition that the Government hopes for. According to independent oil men there has been no change in the general situation thus far. Prices are about the same as they were a year ago. The one exception is crude oil, which jumped 5 cents on a barrel. This increase is attributed to other causes.

Those who use kerosene are paying about nine cents a gallon, and that rate, it is said, will prevail for some time. It will come as a surprise to many to learn

that there is still a big demand for kerosene from householders. In New York alone almost half a million barrels of kerosene are used every year. The Standard Oil Company and its competitor, the Texas Company, practically divide the bulk of the retail trade. Jobbers purchase the oil from these companies and distribute among the consumers, the corner grocery no longer being a factor in the retail oil trade.

"We are going along under our own steam now, and in a few months we should be able to tell how the new arrangement is going to work out," said William R. King, one of the directors of the Standard Oil Company of New York and the head of the company's retail business. "The actual dissolution was completed on December 24. It would be useless to make a prediction as to the future price of oil to the consumer, because so many factors enter into the making of that price."

At the New York office of the Texas Company, No. 17 Battery place, an officer of that company said:

"There has been no change in the oil situation as a result of the dissolution of the Standard Oil Company, and we think it will be many months before any change will become apparent. We don't look for any change. It will be a case of all companies going after business. The situation is up to the salesmen."

Seep Agency's Announcement.

The announcement was made at Pittsburgh on Dec. 26 by the Joseph Seep Purchasing Agency, the buying power of the old Standard Oil organizations, of an advance in Pennsylvania crude of 5c a barrel, bringing the price paid independent producers to $1.35 a barrel. Other grades were raised in proportion, as follows: Somerset, 79c, an advance of 5c; Ragland, 48c, an advance of 3c. No change was made in the price paid for Mercer Black, Cabell, Nowcastle and Corning.

The last preceding change in the price of Pennsylvania, the basis of the crude oil market, was made June 11, 1910, when the price was reduced to $1.30.

Officials of the Standard Companies stated that there was no particular shortage in the grades of oil affected and expressed the belief that the advance had come as an indication that times were much better and the companies which once made up the greater organization could afford it. It was predicted that it will stimulate development.

New Trolley Cars for Cleveland.

The street railway committee of the Cleveland city council last week approved a resolution authorizing the purchase of 50 new cars.

THE NEW BRITISH STEEL COMBINATION.

[Report to U. S. Bureau of Manufactures by Consul Rufus Fleming, Edinburgh, Scotland; supplementary to report of Consul Halsted, published by the INDUSTRIAL WORLD, December 11.]

FOUR years ago Scotch and English steel makers were selling angles and plates to German shipbuilders at £1 ($4.87) per ton less than the price exacted from British shipbuiders for the same material.

When the discovery was made that the steel concerns were "dumping" ship and bridge steel at a price far below the home quotation, there was much indignation among the large consumers of steel, who moved to stop discrimination against British shipbuilders. At that time a proposal was seriously considered by the great shipbuilding concerns to establish a steel plant for the manufacture of plates, angles, etc., but the project was abandoned as impracticable, owing to the lack of harmony in the shipbuilding trade. The action of the steel companies in having cut prices to foreign buyers was so deeply resented by the leading concerns on the Clyde and in east Scotland that they no longer deemed themselves under any obligation to favor British steel producers, and as the German steel syndicate (Wehrbund) began to offer plates and angles at 5s. ($1.22) per ton less than the British price, these firms increased their German orders. To what extent this was done is indicated by the fact that imports of German manufactured steel into the United Kingdom rose from 353,752 tons in 1907 to 646,034 tons in 1910. This loss in the home market has been severely felt by the steel makers.

Specifications of the Rebate

As a means of recovering their position 23 important steel concerns have combined under the name of the English and Scottish Steel Makers' Association and have issued a circular stating that they will give to all consumers a rebate of 5s. ($1.22) per ton on specified classes of material, this rebate to be payable on all such material delivered direct from makers' works to and used by consumers, subject to the terms and conditions fully set forth in the circular a copy of which is forwarded [and filed for public inspection in the Bureau of Manufactures]. The main condition is that consumers who wish to participate in the rebate shall not purchase or receive any similar material manufactured by other than the signatory concerns. The specified classes of material on which the rebate will be paid are: Ship and bridge plates over one-fourth in thick, angles, tees, channels, flats over five inches wide, bulb angles, bulb tees, plain tees, plain bulbs, zees. This arrangement does not apply to any of the specified material sold for export.

A rebate of 5s. ($1.22) per ton is also offered to steel merchants "for stock and subsequent distribution, such stock orders to be specified in lots of not less than 25 tons in one specification on one day and in stock lengths of even feet, subject to the condition contained in the circular."

How It Is Regarded in Scotland.

The list of members of the association comprises practically the entire steel industry of Scotland and includes most of the prominent English concerns. The principal steel merchants and consumers in this district do not regard the rebate proposal with favor. Merchants say that it is an effort to reach consumers over the heads of the merchants, which will not be satisfactory to consumers, for it is to their advantage to buy from merchants, who can offer at favorable prices the qualities of steel desired, derived from a wide market. Some consumers—shipbuilders—say that, inasmuch as no assurance is given that prices will be fixed on a fair basis, they foresee an advance in prices which will more than cover the rebate. Moreover, the opinion is held that the agreement will prove to be unworkable for this reason: As all the members must sell at the same price, the makers of the best steel will get the orders, to the loss of other concerns that now obtain trade by granting concessions to customers.

Should the English and Scottish Steel Makers' Association receive substantial encouragement from British consumers, it is expected by merchants here that the German steel combination will reduce prices still further in the British market.

After a Novelty Factory.

The Terre Haute (Ind.) Commercial Club is trying to secure the manufactory to be established by the Automatic News Distributing Company, recently incomporated in Cincinnati with $3,000,000 capital stock, which will make the machine patented by a Cincinnati man for the sale of newspapers by slot payments. J. E. Beggs, president of the Commercial Distilling Company, of Terre Haute is a leading stockholder.

Boston & Maine has ordered a total of 810,000 tons of coal from the Virginia Iron, Coal & Coke Company, on contract extending over five years.

Weekly Summary: Investment Securities in the Metal Industries.

STOCK AND BOND SALES AT VARIOUS EXCHANGES.

Sales include December 22 to December 28, four business days.

	New York*	Pittsburgh	Chicago	Philadelphia	Boston	Total Sales	High	Low	Last
Allis Chalmers	100					100	1⅜	1⅜	1⅜
Allis Chalmers pf.	800					800	8⅜	8	8
American Can	1,520		400			1,620	107⅜	105⅜	105⅜
American Can pf.	1,150		220			1,370	90	89⅝	90
American Car & Foundry	1,830					1,830	54¼	53½	53½
American Car & Foundry pf.	100					100	105	105	105
American Locomotive	210					210	36½	36¼	36½
American Steel Foundry	200					200	33½	33	33
American Steel Foundry pf.	100					100	103	103	103
American Shipbuilding			200			200	50¼	50¼	50¼
Am. Brake Shoe & Fdy. pf.	400					400	130	117¾	117¼
Amoskeag					734	734	80	78	78
Amoskeag, pf.					202	202	100⅛	99	99
Baldwin Locomotive pf.	180			100		280	103⅞	103⅞	103⅞
Bethlehem Steel	5,320					5,320	31⅞	30	30½
Bethlehem Steel pf.	2,110					2,110	61⅞	60¼	61½
Cambria Iron				20		20	44¾	44½	44¾
Cambria Steel				847		847	45	44½	44⅞
Colorado Fuel & Iron	670					670	28	26¾	27
Consolidation Coal & Coke				2		2	79	79	79
Crucible Steel		1,255				1,255	13¼	12½	12¾
Crucible Steel pf.		820				820	83¾	82½	83¾
Chicago Pneumatic Tool			20			20	46½	46½	46½
Electric Storage Battery				356		356	54¼	53⅜	53⅜
General Electric	500				30	530	155⅛	154	154
General Motors	120					120	35½	35½	35½
General Motors pf.	300					300	78⅜	77¾	78
Gt. Northern Ore Prop.	15,380					15,380	40⅜	36½	37¼
Harbison-Walker Ref.		30				30	40	40	40
Harbison-Walker Ref. pf.		10				10	99	99	99
International Harvester	5,000		220			5,220	111⅜	107	107
International Harvester pf.	100					100	120½	120½	120½
International Steam Pump pf.	100					100	83	83	83
Lake Superior Corp.				5		5	26½	26½	26½
Lackawanna Steel	100					100	30	30	30
McCrum-Howell			145			145	41½	40	41½
McCrum-Howell pf.			245			245	91¼	90	91¼
National Lead	7,640			10		7,650	54¾	53¾	53¾
National Lead pf.	50					50	106	106	106
Nat. Enam. & Stamp.	100					100	12½	12¼	12½
Pennsylvania Steel pf.				105		105	102½	102½	102½
Pittsburgh Coal	800	300				1,100	18⅝	18¼	18½
Pittsburgh Coal pf.	400	205				605	82	81½	81½
Pittsburgh Steel pf.	100					100	101	101	101
Pressed Steel Car	100					100	33½	33½	33½
Pullman Company	250				188	438	159½	159	159
Railway Steel Spring	400					400	30⅞	30⅝	30⅞
Republic Iron & Steel	3,430					3,430	27⅝	25	25
Republic Iron & Steel pf.	2,000					2,000	84⅞	84	84
U. S. Cast Iron Pipe	200			100		300	17	16¾	16¾
U. S. Cast Iron Pipe pf.	50					50	52	52	52
United States Steel	218,700	60	675	10,120	4,432	233,987	68⅝	66¾	66¾
United States Steel pf.	2,910					2,910	111½	110½	110½
Union Switch & Signal		30				30	88	87	88
Vulcan Detinning pf.	50					50	66¼	66¼	66¼
Westinghouse Airbrake		335				335	154	153½	154
Westinghouse Electric	2,000	855				2,855	68	65¼	65¼
Westinghouse Electric pf.	100	35				135	117½	117½	117½
Westinghouse Machine		50				50	20	20	20
Warwick Iron & Steel				542		542	12	11¾	12

Quotations are based on New York Stock Exchange, when listed on that exchange. New York totals include sales on Consolidated Exchange.

BOND SALES.

	High	Low	Last
NEW YORK			
143,000 Allis-Chalmers 5s	53¾	49⅝	53¾
1,000 Baldwin Loco. 5s	103½	103½	103½
1,000 Bethlehem Steel 5s	93¾	93½	93¾
2,000 Col. Fuel & Iron 5s	99¼	99	99¼
500 General Electric 5s	153	153	153
14,000 General Motors 6s	98⅜	98⅜	98⅜
2,500 Int. Steam Pump 5s	91½	90½	90½
17,000 Lack. Steel 5s 1915	91	90⅜	90⅜
7,000 Lack. Steel 5s 1923	96¾	96⅝	96⅝
20,000 Lack. Steel 5s 1950	78⅜	77	78⅜
2,000 Key Steel Spring 5s	97⅜	97⅜	97⅜
216,000 U. S. Steel 5s	101⅝	101⅝	101⅝
2,500 U. S. Steel Reg.	102	101⅝	102
2,000 West. El. & Mfg. 5s	93	92½	93
PITTSBURGH			
11,000 Pitts Coal 5s	88½	88½	88½

CHICAGO.	High	Low	Last
5,000 Chi. Pneu. Tool 5s.	92	92	92
BOSTON			
14,000 U. S. Steel 5s	101⅜	101½	101½
BALTIMORE			
4,000 Alm. C. & I. 5s	85	84½	84½
2,000 Con. Coal 4½s	97	97	97
41,000 Con. Power 4½s	88½	87⅞	88
1,000 Con. Power notes	99¾	99¾	99¾

BALTIMORE STOCKS.

	High	Low	Last
275 Con. Power	95½	95½	95½
250 Con. Power pf.	100	100	100
10 Con. Coal	100	100	100
100 Con. Coal pf.	100	100	100

FISCAL STATEMENTS

Allis-Chalmers Company.

Holders of the $11,148,000 5 per cent first mortgage bonds of the Allis-Chalmers Company were circularized last week by the Bondholders' Protective Committee, of which James N. Wallace, of New York, is chairman, urging them to join with the committee. The directors of the company are working out a plant of reorganization.

The estimated current assets as of December 31, 1911, are: Receivables, $3,900,000; inventories, $5,000,000; cash, $900,000; total, $9,800,000. Current liabilities and notes payable, $420,000; other liabilities $1,250,000; total, $1,670,000, leaving a surplus of $7,130,000. Including accrued interest on the bonds due January 1, amounting to $279,000, the company has $900,000 cash, against current liabilities of a little less than $3,000,000.

In addition to these assets the company has its works at Milwaukee and Scranton all modernly equipped. The reorganization plan will be submitted as soon as possible.

Car Company Financing.

The Philadelphia News Bureau last week carried this gossip as to car company finances: "In one of the larger Wall street banking houses the relative merits of the car-making companies were being discussed. The leading concerns in this industry, of course, are the American Car & Foundry Company, the Pressed Steel Car Company and the Standard Steel Car Company. They are named here according to their importance in point of capitalization. In the talk referred to a banker remarked that of these companies the one having the smallest security issue was the strongest financially, namely the Standard Steel Car Company. There are few corporations in the country so compact and strongly fortified as this one. Standard Car has only $4,000,000 stock outstanding. It has no bonds. I understand that its surplus is two or three times the amount of its capitalization, and that since it began operations eight or nine years ago it has returned in profits to its owners more than five times the amount of this capitalization, every dollar of which represents a dollar paid in. The principal plant of tStandard Car is at Butler, Pa. It is the most modern and up-to-date plant of its kind in the world. The money that built it was furnished by A. W. Mellon, W. L. Mellon,

R. B. Mellon, bankers, of Pittsburgh, and James B. Brady, of New York.

Dividends Announced.

GENERAL FIREPROOFING.—Quarterly 1¾ per cent on preferred, payable January 1.

ELECTRIC STORAGE BATTERY COMPANY.—Quarterly 1 per cent on common and preferred, declared December 20, to stock of record December 23; payable January 2.

AMERICAN SEEDING MACHINE COMPANY. (Springfield, O.)—Quarterly 1½ per cent on preferred and 1 per cent on common payable January 15 to stock of record December 30.

GLOBE WERNICKE COMPANY.—Quarterly 1½ per cent on preferred, payable January 15 to stock of record December 30.

PITTSBURGH COAL.—Usual quarterly 1½ per cent on preferred, payable January 25 to stock of record January 15.

BUSINESS TROUBLES

GLOBE FOUNDRY COMPANY.—In New York courts, December 26, a petition in bankruptcy was filed against the Globe Foundry Company, 258 Broadway, New York, and Portchester, N. Y., by creditors. It was alleged that the company is insolvent and made preferential payments. Liabilities are $150,000 and assets $65,000. In January, 1910, there were three petitions in bankruptcy filed against the company which were settled by a composition on December 27, 1910, creditors taking debenture bonds for their claims.

Judge Hand appointed John H. Mueller receiver. A total of 25 creditors, with claims of $88,000, joined in the request. The receiver is authorized to carry on the business for 30 days. Among the creditors are Schloss-Sheffield Steel & Iron Company, $8,531, and Musconetcong Iron Works, $5,445. Mr. Mueller has been chairman of the committee of creditors since the former bankruptcy of the company nearly two years ago. Liabilities are $178,967, of which $144,967 are debenture bonds given to creditors in a settlement of the former bankruptcy case. Assets are nominally $125,000, consisting of plant, $61,000; inventory, $41,000; accounts, $23,000, and cash, $400. A portion of the plant was destroyed by fire some months ago, orders were cancelled, and since then the business has been operating at a loss.

WHEELING & LAKE ERIE COAL COMPANY.—At Columbus, O., on December 26, suit to foreclose a blanket mortgage for $834,500 given in July, 1901, was brought in the United States court by the bankers' Trust Company, of New York, against the Pittsburgh, Wheeling & Lake Erie Coal Company, the Wheeling & Lake Erie Coal Company, the Wheeling & Lake Erie Coal Mining Company and M. A. Hanna & Company, consisting of Dan R. Hanna, Robert L. Ireland and Matthew Andrews of Cleveland. The mortgage was given on 16,000 acres of valuable coal lands in Jefferson county, and under its terms $200,000 was to have been paid by July, 1911. The defendant companies were given three months further extension in which to make this payment, failing in which suit was brought. The Bankers Trust Company asks that the property of the defendant in Jefferson county be disposed of to satisfy their claim. It further asks that the defendants be enjoined from disposing of the property without consent of the courts.

PORT OF CONNEAUT HOLDS 1911 ORE RECORD.

CONNEAUT, O., has passed Ashtabula in receipts of Lake iron ore, holding the record for the year 1911. Ashtabula stood second, and Cleveland third.

The figures for the two leading ports, for the year, are:

	Tons
Conneaut	6,987,434
Ashtabula	6,303,647

July, August, September and October were the heaviest months during the year. The shipment of cement both to the upper lakes and to Canada is beginning to assume proportions at all lower lake ports, a large share being sent to Duluth.

The total shipments of ore down the Lakes in 1911 were an even 10,000,000 tons under the total for 1910, and the smallest of any year since 1904. The total for the year is given as 32,130,411 tons, comparing with former years as follows:

	Tons
1904	21,894,401
1905	33,476,904
1906	37,513,595
1907	41,288,755
1908	25,427,094
1909	41,683,873
1910	42,620,201
1911	32,130,411

Shipments by ports during the past two years have been as follows:

Port.	Season 1910	Season 1911
Escanaba	4,959,869	4,278,445
Marquette	3,248,929	2,200,380
Ashland	4,093,822	2,429,290
Superior	8,437,261	9,920,490
Duluth	13,609,155	6,934,269
Two Harbors	8,271,165	6,367,537
	42,620,201	32,130,411

The total ore receipts at South Chicago for the year were 3,685,100 tons; at Gary, 1,302,745 tons.

Iron ore imports into the United States, reported by the government to November 1, 1911, totalled 1,534,811 tons, as compared with 2,219,488 for the corresponding months of 1910 and 1,297,382 for the same months of 1909. The countries contributing the iron ore imports during the first 10 months of the year just closed were:

	Tons
Spain	183,382
Sweden	183,491
Canada	40,224
Newfoundland	142,553
Cuba	961,099
Other countries	24,062
Totals	1,534,811

Census Report on Iron Ore, 1909.

The Census Bureau last week made public a preliminary statement of the general results of the thirteenth census relative to mines producing iron ore, including a summary for 1902 and 1909.

The summary shows increases in all the items at the census of 1909 as compared with that for 1902, except for number of mines.

The value of products increased 63 per cent; the quantity of iron ore produced 42 per cent; cost of materials, 91 per cent; number of salaried officials and clerks, 10 per cent; average number of wage earners, 21 per cent; amount paid in salaries, 41 per cent; amount paid in wages, 38 per cent; miscellaneous expenses, 178 per cent; primary horsepower, 192 per cent.

The decrease in number of mines was 42, or 8 per cent.

The capital invested aggregated $299,350,000 in 1909, and averaged approximately $620,000 per mine.

The quantity of iron ore sold or used by the operators in their own blast furnaces was 50,521,000 long tons in 1909 and 35,567,000 in 1902, an increase of 14,954,000, or 42 per cent.

The value of products was $107,000,000 in 1909 and $65,465,000 in 1902, an increase of $41,535,000, or 63 per cent.

The number of salaried officials and clerks was 2,647 in 1909 and 2,405 in 1902, an increase of 242, or 10 per cent; their salaries amounted to $2,979,000 in 1909, as compared with $2,113,000 in 1902, an increase of 41 per cent.

Whitaker-Glessner Repairs.

The Whitaker-Glessner sheet mill at Martins Ferry, O., remained closed last week, undergoing extensive repairs preliminary to the installation of new sheet mill equipment already ordered.

INDUSTRIAL WORLD

Absorbed the
American Manufacturer and Iron World.

PUBLISHED WEEKLY BY THE NATIONAL IRON AND STEEL PUBLISHING COMPANY.

108 Smithfield Street, Corner First Avenue, PITTSBURGH, PA.
Bell 'Phone, 3909, Court.

Subscription Price, Per Year:
United States and Mexico.....$3.00
Canada $4.00
To all other countries $5.00
Single Copies, 10c.

L. L. CARSON .....Manager.
WILL R. McCORD .....Editor.
F. L. PARKER .....Associate Editor.

Entered as second-class-mail-matter at Pittsburgh, Pa., under the Act of Congress, March 3, 1879.

PITTSBURGH, PA., JAN. 1, 1912.

THE OLD YEAR.

REVIEWING the year 1911 is a review of disappointments to the trade and of almost continually falling prices. It was thought that the year 1910, the year of liquidation after the quick rise of 1909, had liquidated the situation as to prices, and at the opening of the year 1911 there was distinct promise that such would prove to be the case. There had been a firming up in prices in the closing weeks of 1910, and 1911 opened with prospects good. Orders for steel products increased and sufficient enthusiasm developed in the trade to warrant an advance of a dollar a ton in wire products on January 23. This surprised the steel buying trade, for only a short time before an advance in any steel product had been regarded as an impossibility. On February 3 tin plate was advanced 10 cents a box, creating fresh enthusiasm. Conditions soon became less favorable, and while another advance occurred in wire products, March 6, putting the price of nails to $1.70 against $1.60 at the opening of the year, the period of advancing prices was clearly seen to be over. Soon a little shading began to appear, and finally came the spectacular action of the REPUBLIC IRON & STEEL COMPANY withdrawing from the councils of the steel trade and announcing a cut of $3 a ton in steel bars, its chief product, from 1.40c to 1.25c. This precipitated formal reductions in other lines, and May 29 plates and shapes were reduced $1 a ton, billets and sheet bars $2 a ton, and sheets $4 a ton. On June 20 wire products were reduced $2 a ton, to the opening prices of the year. Soon afterward there began an irregular decline in all steel products except standard section rails and by the close of November all finished steel products outside of rails were down $6 a ton as compared with the opening prices of the year. Then began a recovery which has advanced the average of all prices by more than a dollar a ton.

There were reasons for these movements and all will agree as to what were the contributory causes, although there is likely to be much diversity of opinion as to the classification of these causes, which should be placed as primary and which secondary. The causes interacted on each other. Did the withdrawal of the REPUBLIC IRON & STEEL COMPANY from the co-operative movement, break up that movement, or was the withdrawal induced by judgment on the part of the leading spirit in the company that the movement was doomed? There will be difference of opinion as to which was the primary and which was the secondary cause. Whichever the direct cause, the result was an open market on steel products, perhaps the first for many years. It was not long after the history of the break and early recovery in 1909 was written that doubters appeared whether there had been a complete rupture, an entire abandonment of the co-operative policy. There had been many evidences of "team work" both in the decline and in the recovery, and it may be that the last summer marked the first appearance of a wide open market in finished steel products for many years.

In the Spring, the question was, "What is the matter with business?" From the hopefulness of the first month or six weeks of the year conditions had changed by April 1, so that while conditions were fairly good superficially, it was evident that trade had lost its snap, that something had occurred which produced conservatism.

Opinions differed as to what was the cause. There were many theories. In the iron and steel industry much importance was attached to the decisions of the INTERSTATE COMMERCE COMMISSION in the famous "advanced rate cases." These had been handed down February 22 and were entirely adverse to the railroads, denying all the advances, in both the case of central classification territory and the case of the western roads. All along the railroads had insisted that if they were not given these advances they would not be able to make improvements and extensions. Weeks before the word had been passed around in the steel trade, and a story was given special credence, perhaps, because it was an orphan—its parentage too high to be mentioned—that the railroads would be permitted to make about half the advances they had asked, while since they had padded their demands with foresight of this very thing they would really get about all they needed. Naturally the disappointment was all the greater when no advances whatever were permitted.

The broader minded of those who reviewed the situation at this time looked farther than the environs of the steel industry and saw in the calling of the extra session of CONGRESS to consider Canadian reciprocity the cause of the hesitation in business. Perhaps they were right, but more history has since been written and if we accept the theory we shall have trouble in explaining how it is that the steel business improved little if any when that special session closed and did improve markedly in the past few weeks when the same CONGRESS assembled in regular session.

Production of iron and steel showed considerable variation during the year, and it is difficult to say whether the variations were due to changes in the actual rate at which buyers, chiefly the jobbers and manufacturing consumers, took the material. Certainly they did in midsummer and fall reduce their stocks to the smallest quantities observed for a long time. Pig iron production closely followed the production of castings and finished steel, and the record of pig iron is that of having two low points, when a rate of a trifle over 21,000,000 tons a year was reached, and two high points, when a rate of about

MONTHLY AVERAGE PRICES ON IRON AND STEEL PRODUCTS FOR 1911.

Prices are for early delivery; pig iron at points indicated; steel products at Pittsburgh; ferromanganese at Baltimore; Connellsville coke at ovens for prompt shipment.

	Bessemer Basic		Foundry										
	Valley	Valley	Valley	Philadelphia	Chicago	Birmingham	Furnace Coke	Billets	Plates and Shapes	Bars	Black Sheets	Wire Nails	Ferromanganese
January	15.00	13.50	13.75	15.50	15.50	11.00	1.40	23.00	1.40	1.40	2.20	1.71	38.25
February	15.00	13.50	13.85	15.50	15.50	11.00	1.47	23.00	1.40	1.40	2.20	1.75	37.75
March	15.00	13.75	14.00	15.50	15.50	11.00	1.57	23.00	1.40	1.40	2.20	1.79	37.30
April	15.00	13.75	14.00	15.50	15.50	10.75	1.58	23.00	1.40	1.40	2.20	1.80	36.75
May	15.00	13.34	13.76	15.49	15.50	10.69	1.50	22.92	1.40	1.37	2.20	1.80	36.50
June	15.00	13.03	13.59	15.18	15.50	10.24	1.45	21.00	1.35	1.25	2.00	1.76	36.50
July	15.00	13.05	13.50	15.00	15.32	10.00	1.45	21.00	1.34	1.24	2.00	1.70	36.85
August	15.00	13.00	13.50	15.00	15.00	10.00	1.53	21.00	1.30	1.20	1.91	1.69	37.00
September	15.00	12.85	13.50	15.00	15.00	10.00	1.50	20.60	1.28	1.18	1.90	1.65	36.50
October	14.54	12.54	13.41	15.00	14.85	10.00	1.50	20.00	1.19	1.13	1.85	1.64	37.00
November	14.24	12.44	13.25	14.95	14.57	9.98	1.50	19.50	1.11	1.07	1.84	1.56	37.25
December	14.25	12.50	13.05	14.75	14.50	9.75	1.75	19.00	1.13	1.12	1.85	1.53	39.50
Year 1911	14.84	13.10	13.60	15.20	15.19	10.37	1.52	21.41	1.31	1.26	2.03	1.70	37.25
Year 1910	16.26	14.73	14.95	16.87	17.10	11.61	1.78	25.20	1.45	1.43	2.29	1.77	40.49

25,000,000 tons a year was reached. The year opened with the low production, increased rapidly to the high in March, then declined more slowly to a low in July. Thereafter it advanced to the second high in October, practically maintaining the high rate until the close of the year. Instead, however, of promising a decline, the new year opens with the certainty of a moderate increase and the prospect of a very material increase.

With these ups and downs the year turned out about 23,700,000 gross tons of pig iron, which compares as follows with outputs in previous years:

1870	1,665,179
1880	3,835,191
1890	9,202,703
1900	13,789,242
1905	22,992,380
1906	25,307,191
1907	25,781,361
1908	15,936,018
1909	25,795,471
1910	27,303,567
1911	23,700,000

Compared with the outputs of four of the five preceding years, that of 1911 is not at all favorable. Doubtless the general expectation is that the output of 1912 will be greater. here is indeed direct promise that the output during the first half of 1912 will be at a materially higher rate than the output in either the first or second half of 1911. It is with some surprise, however, that one compares the existing conditions with the prediction recently ascribed to a leader in finance and former steel manufacturer, that a new record for production of iron and steel will soon be made. We cannot properly compare any performance of the future with calendar year statistics cited above to justify the claim of a record being broken, for as emphasized in these columns more than once, the record of pig iron production is not a calendar year record, but the 29,800,000 tons of pig iron produced in the 12 months ended July 31, 1910. That is the record which must be broken to justify the recent prediction so much quoted.

Even such a production, however, would not engage the existing capacity, for the blast furnaces now in existence can readily produce about 34,000,000 gross tons of pig iron. This is no rough estimate, nor is it a theoretical capacity; it rests upon the fact that the blast furnaces of the United States at the close of 1906, five years ago, were really producing pig iron at the rate of about 26,000,000 tons a year, while in the intervening five years new furnaces have been built, and old furnaces improved, sufficient to provide 8,000,000 tons of production in addition. Of course the capacity is not strictly "available" at present, because selling prices are below the cost of production at some of the idle furnaces, but it is also below the cost, according to strenuous claims, of some of the operating furnaces.

The feature of the Pittsburgh District's performance in the past year is that on the whole it maintained a better relative rate of production, a higher percentage of active to total capacity, than did the rest of the country. There was an averaging of conditions which produced a net result favorable to the district. Iron and steel consumption has spread over the country, so that a smaller percentage of the total is consumed in the east than was formerly the case. There has been no sudden change, merely a gradual pushing forward to the west and the south of the center of consumption. That has naturally deprived Pittsburgh of a small portion of its percentage of the total. On the other hand, the export trade has largely increased, and the great bulk of the export trade in finished steel products is filled in the Pittsburgh district. In round figures, total exports of iron and steel products in 1911 have amounted to 2,200,000 gross tons, against 1,500,000 tons in 1910, the previous record. There is promise that should the export trade be maintained, and domestic demand throughout the country increase, the Pittsburgh District would be the first to reach full employment of existing capacity.

ONLY semi-occasionally does H. C. Frick break into the "forecast" departments of the Eastern financial journals. The infrequency of his predictions probably has as much to do with the attention they attract in the steel trade as any quality of special significance they may possess. Neverthe-

less the prophecy he is said to have made a week ago to a "personal friend in Wall street" which was promptly handed out to all the financial news bureaus to the effect that the recent improvement in the steel trade "is but the beginning of an increase that will bring it back to the prosperous times of 1909," has been accepted almost as gospel in some quarters. It would be interesting to learn by what route this supposedly private statement reached lthe Wall street news sources.

TWENTY YEARS AGO.

DURING the past year our weekly retrospects have been of conditions 30 years earlier, instead of 20 years, representing our former practice. We have been disappointed at the news value of the 30-year retrospect and do not doubt that the majority of our readers have found the 30-year retrospect less interesting than the 20-year. There is a reason for this. While in general, because times change, the farther back one goes the more divergent conditions he finds, it does not follow that the greater the divergence the greater the interest. After writing 20-year retrospects for a long time, we found when we changed a year ago to a 30-year interval that there was a surprising change in the character of the items we found. There was almost the same difference as there is between archaeology and history. Why? We think because going back 20 years brings us in a measure to the beginning of the present order of things, while going back 30 years brings us to conditions which have totally disappeared. Such things may be of great historical interest, but if one wishes to read or study the history of the iron industry he will not wish to take it in little weekly doses such as a retrospect gives. On the other hand, if 20 years ago many things now existent, well recognized, going out or perhaps just gone out—if such things were then just coming in they will prove of immediate practical interest. With the New Year, therefore, we revert to our old practice of giving our readers a retrospect of things 20 years old instead of 30 years, and believe the change will be commended.

A change occurred in the style of the "[illegible] and Iron World" (our old name), with the beginning of 1892, a change to a size of page 9x12 inches from double that size. The larger size was a partial survival of the oldest style of all for a trade paper, that of a blanket sheet like a daily newspaper. Other trade papers made similar changes at about that time. The year opened with an issue on January 1, 1892, corresponding precisely with our present date. The paper was then dated Friday, against our present Monday. Every year advances the calendar one day in the week, a leap year adding an extra day, and there have been four leap years (1900 missing fire) so that the advancement has been 24 days, the three days over the multiple of seven being taken up in the change from Friday to Monday, thus accounting for the coincidence of dates.

Our issue of January 1, 1892, then, tells us, from the "Railroad Gazette," that 2,153 locomotives were built in 1891, against 2,240 in 1890. From the "Railway Age" (the publications were consolidated a few years ago) we learned that in 1891 4,168 miles of new road were built, against 5,739 miles in 1890 and 12,878 miles in 1887, the year of greatest railroad building. That has easily remained the record, while the building in 1890 and 1891 was about the same as the rate in the past few years.

A columnar section of the shaft at the Oliver Coke Works in the Connellsville region was published, showing the various sections in the 410 feet depth. Such sections are now very familiar.

The Standard Iron Company, Bridgeport, O., intended to add four sheet mills to its plant. The next industrial item tells us that the Aetna Iron & Steel Company, Bridgeport, O., was to start a new sheet mill within a few days, and was dismantling an old break-down mill to make room for still another. These concerns were soon consolidated, and later united with the Junction Iron & Steel Company of Mingo Junction, O. The sheet mills passed to the American Sheet Steel Company when it was formed in 1900.

Our leading editorial observes that "Northern journals and some Southern ones of the better sort as well" had been busily engaged in refuting claims made by southern boomers that pig iron could be made at $7 to $9 a ton in Alabama. Improvements had been made, and a $9 cost really had been reached, a few furnaces getting down to perhaps $8.60; this on a fair basis of computation, for a year's run. Northern furnaces also had reduced costs, an actual reduction, while our editor (Dr. Joseph D. Weeks) regarded the reduction in Southern cost not so much an actual reduction in cost as "a proper development of resources."

CONVENTIONS SCHEDULED FOR THE NEW YEAR.

Gasoline Producers' Association — Ft. Pitt Hotel, Pittsburgh, January 12, 1912.

American Society of Constructing Engineers.—New York, January 9.

American Society of Civil Engineers.—New York, January 17-18.

Supply Men's Association of Boiler Manufacturers (U. S. and Canada)—St. Charles Hotel, New Orleans, March 11-14.

American Railway Engineering Association.—Chicago, March 19-21.

Master Boiler Makers' Association—Pittsburgh, May 14-17, 1912.

Ohio Society Mechanical, Electrical & Steam Engineers.—Pittsburgh, May 16, 17, 18.

American Hardware Manufacturers' Association and Southern Hardware Jobbers' Association.—Nashville, Tenn., May 28-31.

Railway Master Mechanics.—Atlantic City, June 17-19.

Master Car Builders.—Atlantic City, June 12-14.

Railway Supply Manufacturers. — Atlantic City, June, 1912.

Railway Bridge & Building Association. —Baltimore, October 15-17.

YEAR'S PIG IRON OUTPUT NEAR 24,000,000 TONS; 1911 MARKED BY EXTREMES IN PRICE CHANGES.

PIG IRON production for the year 1911 will come within 200,000 tons of a total of 24,000,000 tons, as compared with 27,298,545 tons in 1910 and 25,795,471 tons in 1909. Reports for the month of December will not be completed for about a week, and the half-year's report on charcoal iron output also is to hear from.

On December 1 of this year there were 211 blast furnaces in blast, with a combined capacity of 66,609 tons of iron daily. This was one furnace less than was working on November 1. To Christmas week, ten additional furnaces had gone in blast.

The following table shows the number of furnaces in blast on the first of each month during 1911, and their total daily capacity:

	No. Furnaces	Total Capacity
December 1	211	66,609
November 1	212	66,818
October 1	213	66,468
September 1	203	63,214
August 1	196	59,690
July 1	197	59,979
June 1	203	61,844
May 1	212	64,432
April 1	231	70,752
March 1	222	66,562
February 1	206	59,568
January 1	189	53,347

Better Running at Year-End.

Production for the first half of the

year, according to the official report of the American Iron & Steel Association (Swank's Bulletin, August 1), was 11,665,796 tons, divided as follows: Bituminous, 11,355,722 tons; anthracite, 149,227 tons, charcoal, 160,847 tons.

The estimated output for the second half is 11,998,384 tons, of which 11,828,340 tons is estimated to be from anthracite and bituminous furnaces, and 170,000 tons from charcoal furnaces. The figures on this estimate follow—those for the first six months being the official statistics of the American Iron and Steel Association:

	Tons
*First half-year	11,665,796
†July (31 days)	1,793,068
†August (31 days)	1,926,637
†September (30 days)	1,977,102
†October (31 days)	2,102,147
†November (30 days)	1,999,433
‡December (31 days)	2,200,000
Total, coke and bituminous second half	11,828,384
‡Charcoal, second half	170,000
Estimated total for year	23,834,183

* Official; Swank's bulletin.
† Unofficial monthly reports.
‡ Estimated.

If anything, these estimates will be found a trifle low, it is believed.

Summer Months Were Poor.

In the year just ended, January was slow, but February, March and April picked up, March being the best month of the year as far as production was concerned. May, June, July and August were all poor months, tonnage running at the rate of about 59,000 to 60,000 tons per day, compared with 70,000 for March. From August on, however, the output increased until October showed nearly 68,000 tons per day. December will run slightly over November in production, so that the total for the year should be about 3,000,000 tons less than 1910.

Production of iron each year for a decade follows (charcoal iron excluded):

Tons.	Production.	Changes.
*1911	23,800,000	Dec. 3,044,304
1910	26,844,775	Inc. 1,049,304
1909	25,795,471	Inc. 9,864,452
1908	15,931,018	Dec. 9,850,343
1907	25,781,361	Inc. 474,170
1906	25,307,191	Inc. 2,314,811
1905	22,992,380	Inc. 6,495,247
1904	16,497,033	Dec. 1,512,219
1903	18,059,252	Inc. 287,645
1902	17,821,307	Inc. 1,942,953
1901	15,878,354	†Inc. 2,089,112

*Estimated.
†Increase over the production of 1900.

Prices the Worst Feature.

While the year 1911 will not go down in history as a notoriously lean one in point of pig iron production, in prices it has been one of the worst in a decade, profits being so low that merchant production fell off considerably. Steel companies usually making their own iron entered the open market for iron during the last few months of the year, holding it up slightly.

The year and a half just ending has been a period of anxiety to merchant producers more than to the steel manufacturers who make their own iron when the market is high, and buy it when cheap. Valley iron is at present selling from 50 cents to 75 cents a ton lower than six months ago. Another instance of low prices is No. 2 foundry southern iron. About the middle of November, 1910, this iron was quoted at $11 and $11.25 a ton. Three weeks ago lower grades sold on a basis of $9.25 for No. 2. This was caused by the heavy stocks that the southern furnaces had on hand, and by the poor demand for the past year or more.

Illustrating the year's downward tendency of pig iron prices, the following table shows quotations for different grades now, as compared with two and three years ago:

	Present	Jan. 1910	Jan. 1911
Valley, basic	$12.50	$16.75	$15.00
Valley, Bess	14.25	19.00	16.25
Valley, fdy.	13.00	16.90	15.40
Buffalo, fdy.	13.50	17.25	16.25
Phila. fdy.	14.50	19.00	17.25
South fdy No. 2	10.00	13.50	13.00

Rogers, Brown & Co.'s Forecast.

In their regular end-of-the year forecast of the iron trade, Rogers, Brown & Company say:

"Production of pig iron during 1911 has been uniformly small. The total production for the 12 months will not go over 24,000,000 tons, if it does this. Conservative estimates place the production at a trifle over 23,000,000 tons for the year. This is opposed to 26,800,000 tons in 1910 and 25,300,000 tons in 1909. December will probably be one of the largest months of the year. Starting out in January of 1911 with production of 1,700,000 tons, there was little change in February and a slight increase in March, carrying these figures over 2,000,000. There was little change in April and then began a decline for three months, stopping in August with slight increase, which has since kept up.

"The general consumptive capacity of this country is, of course, greater than ever before and during 1911 most lines have kept steadily at it with increasing tendency. There has been political unrest and the continued attitude of railroads against making any but absolute expenditures, which has perhaps had the greatest influence on the manufacture and consumption of iron, which otherwise would have brought the figures well up to the greatest in history. It is largely the railroads which have made the buying movement in the last two months. Purchasing of structural material, rails and rolling stock, have been highly satisfactory. Car shops are running fuller capacity now than for some years and steel makers are optimistic.

"Considering 1912 in its relation to the iron trade, it is best to state that the prevailing thought in the metal trade is one of hopefulness and optimism. It is expected 1912 will start in easy, and, it is hoped, will gradually improve, although a year of political unrest which should be taken into serious consideration. Whereas a year ago the country had reached a point in its productive capacity somewhat in advance of its consuming ability, it is thought there is now more nearly a point of balance between the two than there was 12 months ago, and this should have undoubted effect on the improvement of iron market conditions especially."

Swedish Iron and Steel Trade.

According to a report from U. S. Consul Stuart J. Fuller, of Gothenburg, published in a recent issue of the Consular & Trade Reports, the Iron Manufacturers' Association of Sweden shows small variations in exports for the first nine months of 1911, comparisons with the same period in 1910 being given in parenthesis, as follows: Pig iron, 98,700 ton (+6,300); ingots, 9,400 (—1,200); blooms, 19,900 tons (—2,600); bar and rolled wire rods, 118,800 tons (—6,700). The water famine curtailed the output of ingots and blooms.

In the third quarter of 1911 there were in operation in Sweden 84 blast furnaces, 204 hearths, 16 Bessemer, and 51 Martin plants. Their production for the first nine months, with variations from the same period in 1910 in parenthesis, was as follows: Pig iron, 478,300 tons (+37,600); blooms, 103,800 tons (—7,800); Besemer ingots, 65,600 tons (—12,600); Martin ingots, 277,400 tons (—95,900).

INDUSTRIAL FIRES.

Baltimore.—Pattern storage building of Maryland Steel Company, at Sparrows Point, Md., burned with contents December 28. Loss about $100,000.

* * *

Georgetown, Ky.—Bursting ammonia tank caused destruction of Indiana Refining Company's plant, with tanks and machinery, December 24. Loss $125,000.

* * *

Brookville, Ind.—Box department of Thompson-Norris Paper Company, 4-story building, burned with contents December 23. Loss $100,000, partly insured.

* * *

Ft. Dodge, Ia.—Quaker Oats plant here totally destroyed December 24. Power plant wrecked. Loss $200,000.

Market Conditions in Pig Iron.

THE LOCAL MARKETS.

Heavy Holiday Week Shopping--Basic Inquiries Pending.

PITTSBURGH. — The unlooked-for feature of the week's pig iron trading has been the sale of 1,700 tons of Valley basic iron to an Eastern buyer, for second quarter delivery, at $12.45 Valley furnace. This is an advance of 15 cents over the highest price yet secured for basic iron on the present movement. The Pittsburgh Steel Company is still negotiating for some tonnage of basic for first quarter delivery to Monessen, Pa., but has not yet closed for any of the iron, though quotations under $12.50 Valley are known to have gone in on a part of the tonnage.

Large purchases of foundry grades of iron are reported, one of 3,000 tons, first half delivery, at $13 Valley furnace.

One sale of 1,500 tons of malleable to an Ohio buyer is reported at a shade better than $12.50, Valley furnace. A sale of 2,000 tons of forge, first quarter, showed the price of $12.50, Valleys still available.

Two sales of Bessemer iron, aggregating 2,000 tons, January and February shipment, showed a price of $14.25, Valley furnace. This price no longer holds on Bessemer quotations through second quarter.

Upwards of 20,000 tons of basic are still pending in this market, and a good tonnage of foundry grades.

Quiet Week at Philadelphia.

PHILADELPHIA. — Business has been at a standstill through the holidays. The week's business of any size was 3,000 tons of Southern iron for delivery in this territory over the first quarter. The price was on a basis of $10, Birmingham, for No. 2 foundry. Founders and furnacemen are content to hold aloof from the market for the present while they make their annual inventories and do some small repairing. This work will be completed by the middle of January and after that date dealers expect a steady run of buying to set in again. What buying is done from this on will be at better values, it is believed. Furnace interests have advanced their open quotations by 50 cents a ton. The fact that immediate production is well sold up at the former low prices puts them in a better position to stand firm.

Large Inquiry at Seaboard.

NEW YORK.—Pig iron houses are working on about 10,000 tons of iron under inquiry in the metropolitan area. Much of this is made up of small lots of 500 tons each, but there are a few inquiries for 1,000 tons. A late development was the closing of a 1,000-ton inquiry by a Connecticut founder for delivery over the first quarter of 1912. A Buffalo interest booked the order. A Conencticut hardware interest is understood to be in the market for a medium tonnage, to be closed after January 1. The other inquiries making up the total of pending requirements are not being pushed actively to a conclusion and it is believed that a large proportion will be left open until after the new year. Buffalo interests are firm at the recent advance of 50 cents, while Pennsylvania producers have marked up values by about the same amount. Southern iron stands at $10.25 for the second quarter of 1912, while production is well sold up for the first quarter.

Sharp Western Advance Expected.

CHICAGO. — A sharp advance is expected in the West on foundry iron for second quarter delivery. A sale of 2,500 tons of No. 2 for first quarter delivery at $14.35, Chicago, was reported during the week. Tonnages of malleable moved during the week aggregated 12,000 tons.

Ohio Market Firm.

CINCINNATI.—The absolute minimum on Southern iron is $10, Birmingham, for any delivery, with a number of Southern producers asking 25 to 50 cents premium on second half contracts. The fact that a number of substantial second-half tonnages are under negotiation at these figures shows the state of mind of consumers in this territory. The price of Northern iron continues on the basis of $13, Ironton, considerable tonnage having been contracted at that figure. One Central Ohio interest took 4,000 tons of Northern No. 2, and an Indiana consumer bought 4,000 tons of Nos. 2 and 3, first half, divided between northern and southern sellers. Of Cincinnati market conditions, Rogers, Brown & Company say in their regular weekly report to the Iron Trade Review:

> The good buying movement of the last three or four weeks, with its presage of better things to come, does not cause entire forgetfulness of the year as a whole and its poor business, low prices and general unsatisfactory character from the iron maker's standpoint. There has been the deadly sameness throughout the year that has meant the blowing out of furnaces, reduction in output and actual loss in most cases for manufacturers which kept running.
>
> Whereas in previous years Southern iron has fluctuated during the twelve months to the extent of $10.00 or $15.00 per ton, even in recent years, the record of Southern No. 2 foundry at Cincinnati during 1911 was high $14.25 and low $13. Starting in January on the basis of $14.25 this price ruled until June, almost six months, continuously, at that time registering $13.75 and the following week going to $13.50, where it has remained consistently until it struck $13.25 early in December. At the present time the Southern market is stronger with an advancing tendency, and in the case of some furnaces an advance of 50 cents per ton over the figures in early December.
>
> Northern iron has pursued the same course. Starting out at $15.70 in January at Cincinnati, Northern No. 2 held this price until the middle of April when a slump of 50 cents per ton brought it down to $15.20 for the following five weeks and in the middle of June going to $14.70, where it has been ruling until early December when another cut of 50c per ton was registered. At the present time $14.20 is the figure at Cincinnati for spot business, but as most of the recent buying has been for future deliveries the price is better and the advancing tendency is stronger even than in Southern brands, as the furnaces' books are in better shape.
>
> Locally buying for next year has been good and southern Ohio furnaces, which

PRINCIPAL PIG IRON SALES OF THE WEEK.

Tons.

Pittsburgh.

1,700 Basic, second quarter, to Eastern buyer, $12.45 Valley furnace.
2,000 Bessemer (in two sales), January and February deliveries, $14.25, Valley furnace.
2,000 Forge, first quarter, $12.50, Valley furnace.
1,500 No. 2 Foundry, first half, $13.10, Valley furnace.
3,000 to 5,000 No. 2, first half, $13, Valleys.
1,500 Malleable, first half, to Central Ohio manufacturer, $13 Cleveland furnace.

Cincinnati.

4,000 Basic, to Southern Ohio steel interest, first half, from Ohio furnace.
1,000 Northern Malleable, first half, to Ohio interest, $13, Ironton.
3,000 Southern No. 2, prompt and first quarter, $10, Birmingham.

Chicago.

2,000 Malleable to Illinois melter, from Lake furnaces, $12.80, furnace.
2,500 No. 2, first quarter, (Northern iron), $14.35, Chicago.

New York.

2,000 Northern No. 2X, sold to Connecticut interest by New York State maker, first half, $15.25, delivered.
3,000 No. 3, to New York State consumer, second quarter, $13, Buffalo.
5,000 Low Phosphorus, to General Electric and American Steel & Wire, by two different furnace interests, first half, about $16, furnace.
5,000 Basic to Philadelphia district interest, second quarter, price not given.

ship a great portion of their output into this territory, have their order books for the first half in excellent shope. Some are now refusing to take business for these deliveries except at an advance and the outlook for 1912 is good.

THE COKE MARKET.

Spot Coke Up to $2—Production Stationary.

CONNELLSVILLE. — The production of coke for the Connellsville region for the week ending December 23, was 318,685 tons, which compares with 330,793 tons for the week ending November 25. The "Courier's" comparative figures for two weeks show:

Coke Produced By—	Week Ending Dec. 16	Dec. 23
Furnace interests (tons)	174,752	174,104
Merchant ovens (tons)	143,482	144,581
Total output (tons)	318,234	318,685
Active ovens	26,079	26,230
Shipments (cars)	9,254	9,372

Of the prospects, the "Courier" says in its current issue:

Six months or more ago, the yards of the coke region were stacked with stock and individual sidings were crowded with unconsigned loads. There was a glut of production and consequently a glimmering of profit. Within that time the surplus coke has been removed and with its removal prices have been materially marked up. The manner in which the merchant interests have come together holds out hopes of better things. It is not impossible that there will be another and a stronger proposition presented to the producers within the coming year.

Production last week made a gain of 451 tons as compared with the week before.

Belated Demand Sends Prices Up.

PITTSBURGH. — Demand for spot coke, to insure supplies to furnaces during the early days of 1912, put the price up to $1.90 and $2 for immediate shipments of furnace coke. Some 4,000 to 5,000 tons of spot coke sold at $1.75 to $1.80 immediately preceding and immediately following Christmas day. During the latter part of the week, with no stocks in the Connellsville region from which to draw, quotations on small lots of spot Connellsville coke were made at as high as $1.90 and $2. This condition, of course, is merely temporary, owing to the decline in outputs in the region during the holidays.

Furnace coke contracts for next year's delivery have been finally closed in the past week involving about 50,000 tons a month. These were practically all merely the renewal of contracts which expire December 31st, and were closed between the same parties again, with such modification of prices as conditions warranted. Such changes have been slight, measured in dollars and cents, because the contracting a year ago was at practically the same level as at present. There has, however, been some modifying of terms in the case of sliding scale contracts, for pig iron is lower all around than a year ago, 75 cents in the case of Bessemer and foundry, and $1 in the case of basic. Furnace coke on contract is still to be had at about $1.75 for six months from January 1. Prompt foundry coke remains at $2 to $2.10 and on contract up to $2.25.

Pennsylvania Highways Department during 1911 issued licenses for 44270 automobiles, besides 4,034 dealers' licenses.

Crude and Finished Steel Products.

RAIL TONNAGE PENDING.

Heavy Reservations Expected Within a Week—Structural Negotiations.

NEW YORK—Interest in steel circles centers in estimates of the prospective tonnages in rails and car orders. If the Pennsylvania and the New York Central requirements come up to expectations the rail tonnage will reach close to 600,000 tons and car orders already placed under negotiation will total about 500,000 tons. These requirements include 100,000 tons of rails pending in the South. The Grand Trunk and other Western roads will not release their orders for equipment until after January 1.

One of the roads which made known its wants last week was the Baltimore & Ohio, which awarded 17,000 tons of rails to the Carnegie Company; 7,000 to the Illinois Steel, and 10,000 to the Pennsylvania Steel Company. The Baltimore & Ohio ordered 40,000 tons altogether and the 6,000 tons remaining will be distributed in the East. Within the last 10 days 25,000 tons of rails have been ordered for export, of which 4,500 tons will be rolled by the Maryland Steel Company for the Mexican National Railways. The Soo Line takes 18,000 tons from the Illinois Steel Company.

There has been some activity in bridge work. The Wisconsin Bridge & Iron Company has booked 1,400 tons for the Grand Trunk to be used in a bridge at Bay City, Mich, and miscellaneous orders bring the total to about 20,000 tons pending and placed for bridge work. The Lackawanna is negotiating for 4,000 tons to be used in its new Buffalo terminal. The same road has out specifications for 3,000 tons for bridge work. The new Detroit terminal of the Michigan Central will call for 10,000 tons of structural material.

CRUDE STEEL MOVEMENT.

Consumers Covered for First Quarter —Mills Engaged for the Four Months.

PITTSBURGH. — The heavy movement in crude steel contracts is about over, buyers being now comfortably covered for the new year. Specifications were heavy last week on account of some low prices expiring with December. The first fortnight of January is likely to be quiet in both contracting and specifying in crude and finished steel.

Crude and finished steel mills are engaged for two to four months.

There are predictions of an advance in wire about January 1, although no confirmation can be had from official sources either in Steel Corporation or independent circles. In sheets an advance from 1.90c to the 2-cent basis is not unlikely, as the recent advance to the 1.90c basis apparently took up the slack advance in sheet bars, particularly for January and later delivery, and does not leave the sheet mills much better off.

There has been heavy buying in sheets ever since December 15, and the mills are well filled with low-price business.

Contract to Cambria.

PITTSBURGH.—The Cambria Steel Company has booked 800 tons of structural to be used in an addition to the Edison works in Detroit. The Pennsylvania Steel Company will roll 6,000 tons of girder rails for Stone & Webster of Boston. The American Bridge Company has taken the contract for 1,400 tons of shapes and plates to be used in bridge work for the Buffalo, Rochester & Pittsburgh Railroad and the Wisconsin Bridge & Iron Company will handle 1,400 tons for a Grand Trunk bridge at Bay City, Mich.

Heavy Scrap Buying.

PITTSBURGH.—The Jones & Laughlin Steel Company, which recently created a furore in the local scrap market by buying large quantities of scrap for delivery at Aliquippa, has taken about 5,000 tons additional of heavy melting steel in the past week, paying $13 delivered. Other consumers are not in the market and are bidding nominally $12.25. The market can be quoted at $12.75 to $13.

Bundled sheet contracts about all closed, the dealers paying $10.60 to $10.75 f. o. b. mill, this being considerably above current market which stands about $10.75 delivered.

Range of Weekly Quotations of Pig Iron

PIG IRON At Pittsburgh—	Dec. 30	Dec. 23.	Dec. 16.	Dec. 9.	Dec. 2.	Nov. 25.	Nov. 18.
Bessemer	15.15	15.15	15.15	15.15	15.15@15.40	15.15@15.40	15.15@15.40
Basic	13.40	13.40	13.40	13.40	13.40	13.40	13.40
No. 1 Foundry	14.50	14.50	14.50	14.50	14.75	14.75	14.75.
No. 2 Foundry	13.90@14.15	13.90@14.15	13.90@14.15	14.15	14.15@14.40	14.15	14.00@14.15
Malleable	13.65	13.65	13.65	13.40@13.65	13.40	13.40	13.50@13.70
Gray Forge	13.40@13.65	13.40@13.65	13.40	13.40@13.65	13.40@13.65	13.40	13.40
Low Phosphorus	21.00@22.00	21.60@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00
Ferro Silicon, 50 per cent	70.00	70.00	65.00@70.00	65.00@66.00	65.00@66.00	65.00@66.00	64.00@65.00
Ferro Silicon, 10 per cent	22.90@23.90	22.90@23.90	23.90	23.90	23.90	23.90	23.90
Silicon Spiegel, 10 to 12 per cent	24.40	24.40	24.40	24.90	24.90	24.90	24.90@25.90
Spiegeleisen	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50
Ferro Manganese	40.45	40.45	40.45	39.45@40.45	39.45@40.45	39.45@40.45	39.95@40.45
At Virginia Furnaces—							
Basic	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. 1 X	12.75	12.75	12.75	12.75	12.75	12.75	12.75
No. 2 X	12.25	12.25	12.25	12.25	12.25	12.25	12.25
No. 2 Plain	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25
Gray Forge	12.00	12.00	12.00	12.00	12.00	12.00	12.00
At Birmingham—							
No. 1, Foundry	10.75@11.00	10.75@11.00	10.50	10.50	10.50	10.50	10.50
No. 2, Soft	10.00@10.50	10.00@10.25	9.75	9.75	9.50@10.00	10.00	10.00
No. 2, Foundry	10.00@10.50	10.00@10.25	9.75	9.75	9.50@10.00	10.00	10.00
No. 3, Foundry	9.50@9.75	9.50@9.75	9.50@9.75	9.50@9.75	9.00@9.75	9.50@9.75	9.50@9.75
No. 4, Foundry	9.50	9.50	9.50	9.50	9.50	9.50	9.50
Gray Forge	9.50	9.50	9.50	9.50	9.50	9.50	9.50
At Philadelphia—							
No. 2X Foundry	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25
Basic	14.50	14.50	14.50	14.50	14.50	14.50	14.50
Gray Forge	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25

STEEL. Tons of 2240 lbs., at Pittsburgh—							
Bessemer Billets	20.00	19.00@19.50	19.00@19.50	19.00@19.50	19.00@19.50	19.50@20.00	20.00
Open Hearth Billets	20.00	19.00@19.50	19.00@19.50	19.00@19.50	19.00@20.00	19.00@20.00	19.00@20.00
Forging Billets	26.00	25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00	24.00
Sheet and Tin Bars	21.00	20.00@21.00	20.00@20.50	20.00@20.50	19.50@20.50	20.00@20.50	20.00@21.00
Bessemer Steel Rails	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Open-Hearth Steel Rails	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Light Steel Rails—							
25 to 45 lbs	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00
16 and 20 lbs	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00
12 and 14 lbs	28.00	28.00	28.00	28.00	28.00	28.00	28.00
8 lbs	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Bessemer Wire Rods	24.50@25.00	25.00	25.00	25.00	25.00	25.00	25.00@25.50
Open Hearth Wire Rods	25.00	25.00	25.00	25.00	25.00	25.00	25.00@26.00
Misc. Bar, all pig iron	28.00@29.00	28.00@28.50	27.00@28.00	27.00@28.00	28.00@29.00	28.00@29.00	28.00@28.50

FINISHED PRODUCTS. Tons of 2000 lbs., at Pittsburgh—							
Skelp Steel Grooved	23.50@24.00	23.50@24.00	23.50@24.50	23.50@24.50	23.00@23.50	23.00@23.50	23.00@23.50
Skelp Steel Sheared	24.00@24.50	24.00@24.50	24.00	24.00	23.50@24.00	23.50@24.00	23.50@24.00
Universal Plates	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Sheets, No. 28	38.00	38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00
Galvanized Sheets, No. 28	58.00	58.00	57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00
Beams, 3 to 15 inches	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Beams, over 15 inches	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Channels, 3 to 15 inches	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Channels, over 15 inches	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Tees, 3-inch and larger	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Zees, 3-inch and larger	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Angles, 3 to 6 inches	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00
Angles, over 6 inches	25.00@26.00	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Tank Plates	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00
Boiler Plate	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00
Hoops	25.00@26.00	25.00	27.00	27.00	27.00	27.00	27.00
Bands	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00
Screw Steel Bars	23.00	23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00
Screw Iron Bars	23.00	23.00	23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00
Cold Finished Bars	25.00	25.00	24.00	24.00	24.00	24.00	24.00

and Various Finished Iron and Steel Products.

Nov 11.	Nov. 4.	Oct. 28.	Oct. 21.	Oct. 14.	Oct. 7.	Sept. 30.	Sept. 23.	Sept. 16.	1910. Dec. 31
15.15@15.40	15.15@15.40	15.40	15.40	15.55	15.55	15.90	15.90	15.90	15.90
13.40	13.40	13.40	13.40	13.40@13.65	13.50	13.50	13.50	14.15	14.40
14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	15.15	15.15@15.40
14.15@14.40.	14.15@14.40	14.40	14.40	14.40	14.15	14.25	14.25	14.40	14.65@14.90
13.40	13.40@13.90	13.90	13.90@14.00	13.90@14.15	13.90@14.15	13.90@14.15	14.15	14.15	14.40
13.40@13.50	13.40@13.65	13.65	13.65	13.40@13.90	13.40@13.90	13.90	13.90	13.90	13.90@14.15
21.00@22.00	21.00@22.00	21.00@22.00	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	20.00
64.00	60.00@62.00	59.00@60.00	58.50@60.00	58.00@59.50	57.00	57.00	57.00	54.00@58.00	[illegible]
23.90	23.90	23.90	23.90	23.90@24.90	24.90@25.90	24.90@25.90	24.90@25.90	24.90@25.90	[illegible]
24.90@25.90	24.90	24.90	25.90	25.90@26.90	25.90@26.90	25.90@26.90	25.90@26.90	25.90@26.90	25.00@26.00
21.50@22.50	21.50@22.50	22.50@23.50	23.50@25.50	23.50@25.50	23.50@25.50	23.50@25.50	23.50@25.50	23.50@25.00	23.90@25.90
39.95@40.45	38.95@40.45	38.95@40.15	38.65@38.95	38.95@40.45	38.95@40.45	38.95@40.45	38.45@38.95	38.45@38.95	40.45
12.00	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.75@13.25
12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75	13.75@14.00
12.25	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	[illegible]
12.00@12.25	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	[illegible]
12.00	11.75	11.75	11.75	11.75	11.75	11.75	11.75	11.75	12.00@12.50
10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.75	12.50@13.00
10.00	10.00	10.00@10.25	10.00@10.25	10.00@10.50	10.00	10.00	10.00	10.25@10.50	11.00@11.50
10.00	10.00	10.00@10.25	10.00@10.25	10.00@10.50	10.00	10.00	10.00	10.25@10.50	11.00@11.50
9.50@9.75	9.50@9.75	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	[illegible]
9.50	9.50	9.50	9.50	9.25@9.50	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	10.25@10.75
9.50	9.50	9.50	9.50	9.50@10.00	9.25@9.50	9.25@9.50	9.25@9.50	9.25@9.50	9.75@10.00
15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.50@15.75
14.50	14.25@14.75	14.25@14.75	14.25@14.75	14.50@14.75	14.50@14.75	14.50@14.75	14.50@14.75	14.50@14.75	15.00@15.50
14.25	14.00@14.25	14.00@14.25	14.00@14.25.	14.00@14.25	14.00@14.25	14.00@14.25	14.00@14.25	14.00@14.25	14.00@14.25

20.00	20.00	20.00	20.00	20.00	20.00	21.00	21.00	21.00	23.00
20.00	20.00	19.00	19.00	19.00@19.50	19.00	19.00	20.00	21.00	23.00
24.00	24.00	24.00	24.00	25.00	25.00	25.00	25.00	26.00	27.50@28.00
20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@22.00	21.00@22.00	22.00	24.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00
26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	27.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	29.00
26.00	26.00	26.00	26.00	26.00@26.50	26.00@26.50	26.50@27.00	26.50@27.00	26.50@27.00	28.00
26.00	26.00	26.00	26.00	26.00@26.50	26.00@26.50	26.50@27.00	26.50@27.00	26.50@27.00	28.00
28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@29.00	28.00@29.00	28.00@29.00	29.00

25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00@27.00
28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	29.00@30.00	29.00@30.00	30.00@31.00	30.00@31.00
37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@40.00	37.00@40.00	38.00@40.00	38.00@40.00	38.00@40.00	40.00
57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00	58.00@60.00	58.00@60.00	58.00@60.00	58.00@60.00	58.00@60.00	[illegible]
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	26.00@27.00	28.00
26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	27.00@28.00	29.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	26.00@27.00	28.00
26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	27.00@28.00	29.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	26.00@27.00	28.00
	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	27.00@28.00	29.00
25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	28.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	26.00@27.00	29.00
[illegible]	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	25.00@26.00	25.00@26.00	28.00	28.00
25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	26.00@27.00	27.00	29.00	30.00
27.00	27.00	27.00	27.00	27.00	27.00	27.00	23.00@24.00	24.00@25.00	28.00
23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	24.00@25.00	28.00
[illegible]	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	23.00@24.00	23.00@24.00	23.00@24.00	24.00@25.00	28.00
22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	23.00@24.00	23.00@24.00	23.00@24.00	24.00@25.00	[illegible]
24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@26.00	[illegible]

Detail Prices on Finished Product in Iron and Steel.

STEEL PLATES.

Base prices, tank quality, ¼-inch thick, per 100 lbs., f. o. b. Pittsburgh:	
60 to 100 inches wide	$1.25 $1.30
Extras over base price—	
3/16-inch thick	.10
Gauges 7 and 8	.15
Gauge 9	.25
Gauges 10 and 11	.25
Circles	.20
Sketches	.10
Boiler and flange quality	.10
Marine steel	.40
Widths over 100, to 110 in.	.05
Wiaths over 110, to 115 in.	.10
Widths over 115, to 120 in.	.15
Widths over 120, to 125 in.	.25
Widths over 125, to 130 in.	.50
Widths over 130 in.	1.00

IRON AND STEEL SCRAP

Old steel rails, re-rolling	$12.50	$13.00
Old steel rails, remelting	12.00	12.50
Steel axles	16.00	16.50
Heavy melting scrap	12.50	13.00
Low Phosphorus	14.75	15.25
Sheet scrap	10.25	10.75
No. 1 wrought scrap	12.25	12.75
Machine shop turnings	9.00	9.25
Cast borings	8.25	8.75
No. 1 cast	12.25	12.50
Old car wheels	12.75	13.00
Old iron rails	14.25	14.75
Railway Malleable	11.75	12.00
Iron car axles	21.00	22.00

TIN AND TERNE PLATES.

Open market, f. o. b., Pittsburgh—	
Coke tins:	
14x20, 100 lbs.	$3.40
14x20, 95 lbs.	3.35
14x20, 90 lbs.	3.35
Charcoal tins:	
A grade, 14x20, I. C.	4.40
A grade, 14x20, 100 lbs.	4.25
Ternes:	
20x28, I. C.	6.60
20x28, 200 lbs.	6.50

STEEL RAILS

Fifty pounds and heavier—	
500-ton lots and over	$28.00
Car load lots	30.00
Less than car load lots	32.00
Light rails—	
12 and 14 pounds	30.00
16, 20 and 25 pounds	28.00
30 and 35 pounds	28.00
40 and 45 pounds	28.00
Relaying rails—	
Subject to inspection, f. o. b., Pittsburgh:	
Standard 50 lbs. & heavier	$23.00 $23.50
25 to 40 lbs	24.00 24.50
16 to 20-pound rails	24.00 25.00
12 pound rails	25.00 26.00

STEEL SHEETS.

Open market, per 100 lbs., f. o. b. Pittsburgh— Gauge.	Black	Galv.
30	$2.05	$3.25
29	1.95	3.00
28	1.90	2.90
27	1.85	2.75
25-26	1.80	2.60
22-24	1.75	2.40
17-21	1.70	2.30
15-16	1.65	1.95
13-14	1.60	1.95
Blue Annealed.		
10 and heavier	$1.40	$1.45
11-12	1.45	1.50
13-14	1.50	1.55
15-16	1.60	1.65
Corrugated Roofing.		
Per square, 28 gauge, f. o. b., Pittsburgh—		
Painted	$1.35	
Galvanized	2.50	$2.55

WIRE AND NAILS.

Prices to jobbers in car load lots, per 100 lbs.; retailers 5 cents additional :

Wire nails	$1.50@1.60
Plain wire	1.30@1.45
Painted barbed wire	1.55@1.70
Galvanized wire	1.80@2.00

ALUMINUM PRICES.

No. 1 ingots, guaranteed over 99 per cent pure are held at 24c per pound in ton lots.

For small lots of 100 pounds and over advances of 3c per pound are charged. Rods and wire .....base price 31 cents
Sheets .....base price 33 cents

BITUMINOUS COAL PRICES.

Pittsburgh district, f. o. b. mine—	Per Ton
Mine-run	$1.15@1.25
¼-inch	1.25@1.35
1¼-inch lump	1.35@1.45
Slack	.65@ .75

	Ohio	
At Cleveland—	Pgh.	No 8
Mine-run	$2.13	$1.95
¼-inch	2.23	2.05
1¼-inch lump	2.33	2.15
Slack	1.63	1.40

	Free-	
At Buffalo—	Pgh.	port.
Mine-run	$2.40	$2.10
¼-inch	2.50	2.20
1¼-inch lump	2.60	2.30
Slack	1.90	1.60

	Ohio	
At Detroit—	Pgh.	No. 8
Mine-run	$2.55	$2.25
¼-inch	2.65	2.35
1¼-inch nut	2.75	2.45
Slack	2.05	1.60

	Ohio	
At Chicago—	Pgh.	No. 8
Mine-run	$3.05	$2.75
¼-inch	3.15	2.85
1¼-inch nut	3.25	2.95
Slack	2.55	2.20

MERCHANT PIPE.

Base discounts, car load lots, subject to the usual variation of 5 per cent:

	Black Butt.	Lap.	Galvanized Butt.	Lap.
⅛, ¼ inch	73	..	53	..
⅜ inch	74	..	64	..
½ inch	77	..	67	..
¾ to 1½ inch	80	..	72	..
2 inch	81	77	74	70
2½ to 3 inch	81	79	74	72
4½ to 6 inch	..	78	..	70
7 to 12 inch	..	76	..	66
Extra strong plain ends—				
⅛ to ⅜ inch	70	..	60	..
½ inch	75	..	69	..
¾ to 1½ inch	79	..	73	..
2 inch	80	76	74	70
2½ to 4 inches	..	78	..	72
4½ to 6 inches	..	77	..	71
7 to 8 inches	..	70	..	60
9 to 12 inches	..	65	..	55

The above steel pipe discounts are for "card weight." Less than carloads to destinations east of the Mississippi, two points lower.

WROUGHT IRON PIPE.

Full weight genuine wrought iron pipe car load prices to consumers; prices to jobbers one point and 5 per cent.

	Butt. Black	Galv.	Lap. Black	Galv.
⅛, ¼ inch	68	48	..	.
⅜ inch	68	58	.	
½ inch	71	61		.
¾ to 1½	75	67	.	..
2 and 2½ inch	76	69	..	..
3 inch	..	..	71	63
2½ to 4 inch	..	..	74	67
4½ to 6 inch	..	..	73	65
7 to 12 inch	..	..	71	61

Extra Strong Plain Ends.	Butt.	Butt.	Lap.	Lap.
⅛, ¼, ⅜ inch	65	55	..	..
½ inch	70	64	..	..
¾ to 1½ inch	74	68	..	..
2 and 2½ inch	75	69	..	..
2 inch	..	..	71	65
2½ to 4 inch	..	..	73	67
4½ to 6 inch	..	..	72	66
7 to 8 inch	..	..	65	55
9 to 12 inch	..	..	60	50

Double Extra Strong Plain Ends.				
½ inch	60	54	..	..
¾ to 1½ inch	63	57	..	..
2 and 2½ inch	65	59	..	..
2 inch	..	..	61	55
2½ to 4 inch	..	..	63	57
4½ to 6 inch	..	..	62	56
7 and 8 inch	..	..	55	45

MERCHANT STEEL.

Cold rolled and ground shafting, 55 per cent off, car load lots; 50 per cent off less than car load lots; delivered in base territory:

Planished tire steel	$1.30@1.40
Iron finish, up to 1½x½ in.	1.35@1.45
Iron finish, 1½x½ in. and over	1.20@1.30
Toe calk steel	1.70@1.80
Railway spring steel	1.70@1.80
Cutter shoe	1.95@2.05
Flat sleigh shoe	1.55@1.65
Crucible tool steel	7.00@8.00
Open hearth spring steel	2.05@2.30

Freight Rates on Pig Iron, Finished Steel, Coal and Coke

PIG IRON.

Pig iron, from Virginia furnaces to	Pgh.	Cin.	St. L.	Chi.	Phil.	N. Y.	Bos.
Shenandoah	$2.50	$2.35	$3.60	$3.20	$2.35	$3.30	$3.35
Bristol	4.35		3.75	4.10	3.60	4.55	4.60
Buena Vista and Roanoke	2.90	2.35	3.60	3.20	3.00	3.95	4.00
Kayula, Ivanhoe, Rural Retreat	2.90	2.35	3.60	3.20	3.40	4.35	4.40
Pulaski, E. Radford, Max Meadows.	2.90	2.35	3.60	3.20	3.25	4.20	4.25

Pig iron from Birmingham, Ala., tons of 2,240 lbs., to—	
Boston, by water	$4.60
Chicago	4.35
Cincinnati and Ohio river	3.25
Cleveland	4.35
Milwaukee and Northwest	4.75
New York, all rail	5.95
New York, rail and water	4.25
Philadelphia, all rail	5.00
Philadelphia, rail and water	4.00
Pittsburgh	4.90
St. Louis	3.75
To Pittsburgh from—	
Dunbar furnaces	.85
Kittanning furnaces	.60
Scottdale furnaces	.85
Valley furnaces	.90
Wheeling	.90
Valley furnaces to—	
Cleveland	.90

Cleveland		1.65
Columbus		1.65
Cincinnati		2.10
Chicago		2.50
East St. Louis		2.80
Hamilton, Ont.		2.20
Joliet		2.65
Louisville		2.65
New York		2.85
Pittsburgh	.75	.80
Philadelphia		2.15
Richmond, Va.		2.95
Toledo	1.95	2.25
Valley furnaces	1.35	
Milwaukee	2.55	2.75
Detroit	2.10	2.25

PIG IRON AND BILLETS.

Pittsburgh to	Pig iron.	Billets.
Baltimore	$2.15	$2.30
Buffalo	1.75	1.80
Boston	2.85	3.00
Chicago	2.80	3.00
Cincinnati	2.20	2.40
Cleveland	1.40	1.50
Columbus	1.60	1.90
Dayton	1.85	2.20
Detroit	2.15	2.25
Erie, Pa.	1.40	1.50
Indianapolis	2.20	2.65
Louisville, Ky.	2.80	3.00
New York	2.45	2.60
Philadelphia	2.25	2.40
Portsmouth, O.	2.10	2.50
Rochester	1.80	1.90
Richmond, Va.	2.65	2.80
Syracuse	2.10	2.20
St. Louis	3.50	3.80
Steubenville	.80	.90
Toledo	1.75	1.95
Wheeling, W. Va.	.90	1.00
Youngstown	.90	1.00
To Pittsburgh from—		
Mahoning and Shenango valleys		1.00
Wheeling		1.00

COKE.

From Connellsville region, per 2,000 pounds, to—	Fur.	Fdry.
Buffalo	$1.65	$1.90
Baltimore		2.15

TIN PLATE.

Per 100 lbs., Pittsburgh to—	C.L.	L.C.L.
Boston, Mass	18	21
Albany, N. Y.	16	19
Baltimore, Md.	14½	17½
Birmingham, Ala.	41	68
Cleveland, O.	10	13
Columbus, O.	12	15
Cincinnati, O.	15	18
Concord, N. H.	18	21
Charlotte, N. C.	39	61
Charleston, S. C.	33	70
Charleston, rail and water.	23½	31
Covington, Ky.	15	18
Chattanooga, Tenn.	33	65
Chicago, Ill.	18	21
Canadaigua, N. Y.	13½	16
Des Moines, Ia.	37½	48½
Detroit, Mich.	15	18
Denver, Colo.	84	1.18
Dover, Del.	17	20
Buffalo, N. Y.	11	13
East St. Louis	22½	26
Hartford, Conn.	18	21
Indianapolis, Ind.	17	19½
Louisville, Ky.	18	21
Montpelier, Vt.	21	24
Minneapolis, Minn.	32	42
New York	16	19
Norfolk, Va.	20	24
Natchez, Miss.	32	61
Portland, Me.	18	21
Providence, R. I.	18	21
Philadelphia, Pa.	15	18
Richmond, Va.	20	24
Rochester, N. Y.	11½	13½
Syracuse, N. Y.	13½	16
St. Louis, Mo.	22½	26
Terre Haute, Ind.	18	21
Topeka, Kan.	54½	68
Trenton, N. J.	16	19

FINISHED PRODUCTS.

Finished steel products, including plates, structural shapes, merchant steel and iron bars, skelp, pipe, fittings, hoop and cotton ties, plain and galvanized wire nails, rivets, spikes and bolts (in kegs), black plates, except planished, chain, etc., per 100 lbs.:

Pittsburgh to—	
Albany	.16
Buffalo	.11
Boston	.18
Baltimore	.14½
Canadaigua	.13½
Cleveland	.10
Columbus	.13
Cincinnati	.15
Chicago	.18
Harrisburg	.14½
Louisville	.18
New York	.16
Norfolk	.20
Philadelphia	.15
Rochester	.11½
Richmond	.20
Scranton	.15
St. Louis	.23
Washington	.14½
To Pittsburgh from—	
Mahoning and Shenango valleys	.05
Wheeling	.05

COAL.

Coal rates from mines—	
To Ashtabula	$1.00
To Allegheny, Pan Handle Ft. Wayne tracks	.43
To Allegheny, West Penn tracks	.48
To Allegheny, B. & O.	.35
To Pittsburgh, P. R. R. Main Line.	.40
To Pittsburgh, B. & A. V. Div.	.48
To Pittsburgh, B. & O.	.33
To Valleys	.70
To Buffalo	1.25
To Cleveland	1.00
To Detroit	1.40
To Chicago	1.90
To New York, gross ton	2.25
To Philadelphia, gross ton	2.00
From Freeport—	
To Buffalo	1.10

For Lake shipments—	Cargo.	Fuel.
To Ashtabula	.88	.98
To Cleveland	.88	.98
To Erie	.88	.98
West Virginia rates from mines—		
To Chicago		1.90
To seaboard points, gross ton		1.80
From No. 8, f Ohio—		
To Cleveland		.98
To Chicago		1.65
To Detroit		1.15

New Construction and Extensions

Iron and Steel.

Trenton, N. J.—Work started on addition to Trenton plant of National Radiator Company, of Johnstown, Pa.; cost about $100,000. Belmont Iron Works of Philadelphia has contract for the work; steel is being furnished by the Cambria Steel Company. Addition will be 300 by 120 feet, steel and brick. S. B. Waters, Johnstown, Pa., secretary and treasurer.

Cleveland, O.—The Otis Steel Company, Lakeside avenue and East Thirty-third street, will build new steel mill in Cleveland, increase its capital stock from $1,605,945 to $10,000,000, and move its general offices from London, England to Cleveland. George Bartol, general manager of Cleveland plant.

Philadelphia. — Directors of the Warwick Iron & Steel Company decided at a meeting in the Real Estate Trust building, December 20, to lease their corporation to the Eastern Steel Company, for 99 years on an 8 per cent basis. The directors of the Eastern Steel Company will probably take similar action soon. When that is done the stockholders of both companies will be asked to ratify the merger.

Hamilton, O. — Miami Iron & Steel Company, of Hamilton, manufacturing iron and steel and various products, was incorporated at $625,000. Four thousand shares of common stock at $100 and 2,250 shares of preferred at $100, were taken by E. H. Peters, H. Y. Brenneman, Louis A. Ireton, J. C. Thomas and Frank E. Dinsmore.

Portsmouth, O. — It is reported here that blue prints and specifications have already been prepared for another mill shed which the Portsmouth Steel Company will erect to the west of its new jobbing mills. The new structure, according to the report, is to be occupied with a corrugated galvanized plant and will employ 600 additional men.

Duluth, Minn.—Wilrichfern Iron Company has been incorporated at $50,000 capital, by Coryate S. Wilson, R. M. Morgan and others. The business of the corporation is to carry on mining, smelting, reducing, refining and working of iron ores.

Lehi, Utah. — Lehi Commercial club is going after steel plant which Governor Spry told the Utah County Development league was coming to Utah. Representatives will wait on the steel people and show them that Lehi has the best location in the State for becoming a second Pittsburgh.

Foundry and Machine.

Morgantown, W. Va.—Chrisman & Goodwin, owners of Morgantown foundry and machine works, have leased circus grounds in First ward for the erection of a new foundry which will be double the size of the foundry in the Fourth ward. Work is to start at once and it is to be completed as rapidly as possible. Chrisman & Goodwin will continue in the general foundry business upon the completion of their new shops and no additions will be made to the kind of output.

New Kensington, Pa.—Aluminum Castings Company, of New Kensington (subsidiary of Aluminum Company, of America), will install a foundry in connection with its plant and work will be started on the addition at once. W. H. Bloom, superintendent.

Reading, Pa.—Mohn & Kershner, brass and iron founders, Green and Tulpehocken streets closed deal for ground 281 by 500 feet, a part of the Drummond Iron Company tract, on Robeson street. The firm must vacate its present location by April 1, as the property is to be sold. On the new site are several buildings, but the firm will erect a new building capable of accommodating 50 molders. Contract for new building has been let to George H. Sherman. It will be equipped with sand-blast machinery, to do first-class casting. Site is on both the Pennsylvania and P. & R. railroads. Work on the new building, which will be of brick, will be begun next week. The firm is composed of W. H. Mohn and E. L. Kershner.

New Castle, Pa.—George W. Mason Engineering & Manufacturing Company at West Middlesex, will begin in a few days the erection of a new brass foundry.

Power, Hydro-Electric, Etc.

Bristol, Tenn. — First hydro-electric power plant completed in Tennessee was put in operation in Watauga river, four miles east of Elizabethtown, December 25. The plant, constructed by the Watauga Power Company, has a capacity of 3,000 horsepower. United States government is inspecting land embracing the source of the rivers of Upper Tennessee, with a view to purchase power sites as means of protecting streams.

Akron, O.—City of Akron has taken over 600 acres of land near Kent, O., for new water works, and $5,000 has been paid by the city to the Akron Water Works Company as a sign of good faith, that the city will purchase the water plant for $415,000 plus the expense incurred by the company since the option was taken on the plant a few months ago.

Machinery and Tool.

Philadelphia—Atwater Kent Manufacturing Company now located on Sixth street, above Market, has purchased two-acre tract on the east side of Stenton avenue near Fisher's Station, with a railroad frontage; company is having plans prepared by John G. Brown for a one-story laboratory and factory building upon the site for the manufacture of electrical appliances; of slow burning construction, 120 by 166.

Cincinnati, O.—Nicholas P. Smith & Company, of Cincinnati, are negotiating with James Keith & Blackman Company, London, England, with a view of having them establish a branch factory in this city. Several acreage tracts, with railroad facilities, have been submitted. The concern manufactures volume and pressure fans for use in the armies and navies of the world.

Conneaut, O. — MacLean Cream Separator Company, Detroit, has merged with the Atwood Wrench, Tool & Stamping Company, under the name of the Atwood Manufacturing Company. The company has a capital of $150,000. L. A. MacLean, president and sales manager, William Atwood, vice president and general manager; A. C. Tinker, secretary and treasurer.

Utica, N. Y. — Utica Steam Engine & Boiler Works is taking bids for the erection of a one-story addition, 45x120 feet, to the plant at 256-280 Whitesboro street, this city, from plans by Agne Rushmer & Jennison, Arcade Block, Utica, N. Y.

Sherburne, N. Y. — C. F. Guilford, architect and engineer, is preparing plans for a three-story brick cotton house, 45x111 feet, to be erected by the Utica Knitting Company, of Utica, N. Y. Work will go ahead next spring.

Warehouses, Business Bldgs.

Cincinnati, O.—Fred Garber, of Garber & Woodward, architects, Cincinnati, associated with Cass Gilbert in planning the new skyscraper home of the Union Central Life Insurance Company, Cincinnati, announces plans are reaching stage where they will soon be ready for bidders. Estimates will be received some time in January.

Waynesboro, Pa.—Geiser Manufacturing Company, making threshers, engines and saw-mill machinery, has completed a brick warehouse at Trenton, N. J., and is building an addition to its six-

story warehouse at Kansas City, Mo. Plans are in preparation for warehouses in other cities.

Boilers, Power Plants, Etc.

Erie, Pa.—Erie Engine Company is taking bids on construction of 2-story brick, steel and concrete power plant; cost $200,000.

Baltimore, Md. — Contract for erection of new plant of the City Ice Company, Falls Road, has been awarded to York Construction Company, of York, Pa.

Concrete, Brick, Clay.

DuBois, Pa. — Bohemian Art Pottery Company is taking bids on construction of 3-story brick pottery; plans by Architect William H. Overdorff, DuBois.

Berkley, W. Va.—Work has been started on erecting a lime plant addition for the Security Lime & Cement Company from plans drawn by Architect E. W. Lazekk, of Wilmington, Del. Cost $30,000.

Zanesville, O.—Grading has been commenced on site for brick plant for the T. B. Townsend Brick Contracting Company, Zanesville. The building will be a one-story steel structure 70x120 feet and will be used for the manufacture of paving and face brick, also fireproofing material, the capacity of which will be about 400 tons daily. A power plant of about 500 horsepower will be installed in addition to an electrical equipment.

Public Works.

Carlisle, Pa.—Borough of Greencastle held special election to decide on bond issue of $10,000 for completion of new reservoir and waterworks. Proposition carried.

Warren, Pa.—Engineers Albright & Mebus, Land Title building, Philadelphia, have plans in progress for one-story brick sewerage disposal plant for State hospital, to cost $45,000.

Connellsville, Pa. — General Contractors W. H. Fissell & Company, New York City, have broken ground for new government building, Peach and Arch streets, to cost $90,000.

Jefferson City, Mo.—City held special election December 30 to vote on issuance of $70,000 bonds for building viaduct and establishing paid fire department.

Homestead, Pa.—John G. Uncapher & Son, of Minerva, O., were awarded contract for building postoffice at Homestead at $63,496, which was $1,400 lower than the bid of Homestead Lumber Company. Bethlehem steel shapes were specified in the original drawings, and recently a committee of Munhall business men waited upon the officials of the Treasury Department in an endeavor to have Homestead mills furnish the steel for the building. It was explained at the treasury that so far as the department is concerned the Homestead shapes will be accepted if the contractor should decide to use them and providing they come up to government standard.

Hardware, Sheet Metal, Etc.

Elmira, N. Y. — Empire Mobile Car Sign Company purchased from Edward W. Snyder and Benjamin M. Snyder, 72 acres of land located on the south side of the Chemung river west of Walnut street, with the idea of building a factory there.

Bridge; Structural; Ironwork

Charleston, W. Va. — City will expend $2,000 to construct wood trestle; G. S. Brown, Bradford building, city engineer.

Ocean City, N. J. — Carroll Doughty & Company have begun building an amusement pier. Mr. Doughty has associated with him Atlantic City parties; David Johnson, of that city is the contractor.

Auto, Auto Accessory.

Syracuse, N. Y.—The Julian Motor Company. Julian S. Brown, president, contemplates the erection of a new factory at this place. Definite plans not yet adopted.

Miscellaneous.

Baltimore, Md.—Sugar Factories Company has acquired 25 acres of river front at Wagner's Point, in Anne Arundel county, near this city, on which to build a large sugar refinery. All the negotiations are not completed.

Cincinnati, O.—Foundations are in for a two-story brick, frame and concrete lithograph plant to be constructed on Findlay and Providence streets for the Cincinnati Eagle Lithographing Company. General contract was awarded to D. Meinken, 2111 Harrison avenue. Cost $50,000.

Orrville, O.—Architect A. F. Janowitz of Cleveland, is taking bids on constructing a two-story brick, steel and reinforced concrete creamery building, stable and double residence for the Cottage Creamery Company, to cost $55,000.

Harrisburg, Pa.—C. M. Romberger, general manager of Romberger knitting and hosiery mills, Pine street, announces company will build an addition to the factory. Present factory is 130 feet deep, two stories high and an addition of 50 feet will be made.

Cleveland, O. — The brick work is up one story on a two-story brick, steel and concrete factory building, being constructed on Carnegie and East Sixty-fifth streets, for G. F. Mitchell & Son, West Third street. General contract was let to Henry Watterson & Son, Citizens building.

Wheeling, W. Va. — No-Leak Paper Dish Company was launched here December 22, at a meeting at the Windsor hotel. J. H. Edwards, of Weston, was elected president; Hon. Andrew Edmiston, of Weston, vice president, and E. T. Maxwell, of Wooster, O., secretary. Company has an authorized capital of $50,000, of which $36,000 has been paid in. Company will locate Wheeling factory in Handlon-Sharp building, Thirty-sixth street. The company took over the head factory which is located in Michigan. The capacity of the local plant will be doubled within a few months.

Poughkeepsie, N. Y. — The Torrington Building Company, of Poughkeepsie, has received the contract to erect the one-story fireproof factory, 100x65 feet, for the A. V. Manufacturing Company, from plans by P. M. Lloyd. The building will probably be completed by May 1.

"SUN VALVES" AT PANAMA.

[From the Canal Record.]

The work of installing temporary acetylene lights in the two reinforced concrete towers which form Range No. 9-11 in the Pacific Division will be begun this week, and it is expected that the lights will be in operation within a few days.

In connection with this installation it is proposed to test a patent sun valve, which is said to reduce very considerably the consumption of gas. The valve operates upon the principle of a copper cylinder expanding when light falls upon the apparatus, closing a valve, and thus shutting off the flow of gas to the burner. A small pilot flame is left burning. When the light rays are shut off from the apparatus the cylinder contracts, the valve is opened by means of a spring and the gas is allowed to flow into the valve chamber whence it passes out to the burner. Thus during clear weather the main supply of gas will be automatically shut off for about ten hours during the day.

Should the test of the sun valve prove successful its adoption will materially reduce the initial cost of installation, in addition to the constant saving in the consumption of gas.

The naked flame of the lights in this range will be about 20 candle power, which when projected through a locomotive type of headlight will produce about 4,000 candle power.

Charters to New Corporations.

Ohio.

Rockford Materials Company, Wadsworth; crushing rock, sand, gravel, limestone, marl, clay and other materials and operating a stone quarry to crush stone, to make cement products, build roads, &c. Thomas Carroll, T. A. Gruber, Frank G. Ebert, Philip Meister, O. M. Mills.

Coldwater Lighting Company, Coldwater; erecting and operating an electric light and power plant; $10,000. William Jasperson, M. Jasperson, M. E. Smith, F. M. Smith, C. W. Backhus.

Sharp Suark Plug Company, Cleveland; from $10,000 to $20,000; J. F. Johnson, president F. D. Johnson, secretary.

Pan-American Coal Company, Newark; from $50,000 to $60,000; W. N. Fulton, president; Wayne Collier, secretary.

Miami Iron & Steel Company, Hamilton; manufacture of iron and steel and various products thereof; $625,000; 4,000 shares of common of $100 each, 2,250 shares of preferred of $100 each. E. E. Peters, H. L. Brenneman, Louis A. Ireton, J. C .Thomas, Frank E. Dinsmore.

Buckeye Light & Power Company, Covington; building and operating a gas or electric light plant or plants; $40,000 J. H. Marlin, A. W. Landis, John Weaver, John Fenemore, Hugh C. Marlin.

Weger Motor Company, Cleveland; manufacture and sale of internal combustion motors; $100,000. E. C. Rock, J. B. Seymour, E. A. Williamson, L. M. Lamoreaux and J. R. Updyke.

Zimmerman-Kurz Company, Cleveland; manufacturing, buying, selling, repairing and dealing in wagons, buggies and all kinds of vehicles; $10,000. F. W. Zimmerman, William M. Byers, J. A. Burke and Charles A. Aaron.

The American Folding Machine Company, Cleveland; capital increased from $100,000 to $125,000. Philip Monreal, president; E. G. Resh, secretary.

West Virginia.

Chemical Wood Company, Smethport, Pa., $500,000; to manufacture iron, steel and articles of commerce from metal and wood, lumber, charcoal, alcohol and other chemical products from wood; operations located in Tennessee and Pennsylvania. R. W. Hilton, R. E. Burdick, C. D. Comes and F. D. Gallup, of Smethport, and J. M. Hilton, of Bradford, Pa.

Tropical Development Company, of Huntington, W. Va.; will deal in real estate, oil and gas rights; lay off and sell town lots, etc.; $500,000. A. E. Cox, C. E. Cox, William R. Powell and N. E. Stevens, of Huntington, and J. C. Crook, of Marietta, O.

Richwood & Gauley Railroad Company has filed map and profile of survey from junction to Cherry and Gauley rivers, Nicholas county, north along the Cherry river.

Acadian Coal & Lumber Company, of Wheeling, to mine coal and developed mineral lands, cut timber and manufacture lumber, etc., in Braxton and Webster counties; $200,000. Thomas McCabe, of Cleveland, O.; M. J. Sullivan, of Latrobe, Pa.; James Gaffney, of Flushing, O.; W. S. Miller and H. C. Miller, of Wheeling.

Clarksburg Zinc Company, of Northview, W. Va., to manufacture and produce, extract or smelt zinc and spelter in Harrison county; $5,000. George M. Hoffheimer, Charles J. Lippmann, William V. Kish, L. C. Hoffheimer and Charles B. Johnson, of Clarksburg, W. Va.

Steel & Allman Oil Company, of Jane Lew, W. Va., to develop oil and gas lands in Lewis county; $8,000. G. B. Waggonor, W. A. Jackson, P. C. Allman, D. L. Bryan, N. Neely and C. C. Morgan, all of Jane Lew.

New York.

Read & Morrill, Inc., Brooklyn; manufacture autos, molding machinery, builders' supplies, hoisting and excavating machinery, etc.; $100,000. Henry P. Read, 32 Sanford street, Brooklyn; Milton D. Morrill, Conway, N. H.; Herbert A. St. George, 41 Park Row, New York city.

Adirondack Snow Packer Company, Malone, N. Y.; manufacture machines for cleaning snow from roads, etc.; manufacture and deal in road machinery, etc.; $12,000 Frank Alexander, Gabriels; Benj. A. Muncil, Paul Smiths; John B. Hinds, Malone, N. Y.

Ward & Ames Manufacturing Company, Manhattan; manufacture smoke and spark arresters, etc., apparatus to regulate furnace drafts, etc.; $100,000. J. Carlton Ward, Walter W. Ames, Diedrich H. Ward, 31 Nassau street, New York city.

P. J. Martin, Inc., Manhattan; electrical contractors and mechanical engineers; $25,000. P. J. Martin, 1867 Seventh avenue; James Martin, 361 West Thirty-sixth street; Francis J. Clarke, 20 Beekman Place, New York city.

Durable Manufacturing Company, Manhattan; manufacture and deal in builders' mill and engineering supplies; $10,000. John W. Crandall, Alex Berg and Reese D. Alsop, 165 Broadway, New York city.

Central Motor Company, Brooklyn; manufacture motors, machinery, automobiles, etc.; $10,000. Ralph Dubecq, 733 Napier avenue, Woodhaven, N. Y.; Arthur M. Beres, 184 Nineteenth street; William H. Barradell, 193 Rigers avenue, Brooklyn.

Atlantic Communication Company, Manhattan; manufacture wireless telegraph apparatus; $100,000. Paul C. Schuitzler, Charles E. Thorn and Silas A. H. Dayton, 165 Broadway, New York city.

J. P. Putallaz Glass Company, Brooklyn; manufacture glass, etc.; $100,000. W. W. Hoyt, 200 West Thirty-fourth street; Henry Leeds, 759 Lexington avenue; John H. Miller, 61 West One Hundred and Eighth street; all of New York city.

Julian Motor Company, Syracuse; manufacture and deal in motors, engines, motor vehicles, etc.; $200,000. Julian S. Brown, George A. Young, Ernest W. Lawton, all of Syracuse, N. Y.

Thorp Iron Company, Manhattan; Manufacture and deal in structural iron work, etc.; $30,000. A. H. Fischer, W. S. Thorp, New York city; C. H. Parsons, Brooklyn, N. Y.

New Jersey.

The Ball-Wood Company, Elizabeth; manufacture engines, turbines, machines, etc.; $300,000. Elwood C. Ellis, John Milton Ferry, and Jehiel G. Shipman, all of Elizabeth, N. J.

United Railway Signal Company, Trenton; manufacture railway signals; $25,000. William B. Housel; William J. Pierrepont and William U. Ale, Trenton, N. J.

Brik-Blox Architectural Concrete Company, East Orange; manufacture brik-blox, multi brick unite, brick tiling concrete, etc.; $125,000. Ezra Marvin, Riverhead, L. I.; Frederick W. Marquestion, 87 North Nineteenth street, Frederick T. Ellithorpe, Francis Gilbert, of East Orange, N. J.

The Submarine Tender & Life Saving Buoy Company, Ocean City; manufacture a mechanical patented device to be attached to vessel, to be used as a human life saving buoy; $125,000. John V. Pontiere, 916 Asbury avenue, Ocean City. Domonic D. Benedictic, 1311 Arch street, Evan B. Lewis, 1108 Land Title building, Philadelphia.

Spangenberg Electric Company, Newark; manufacture and generation of electric current; $125,000. Leroy Spangenberg, 1051 Springfield avenue, James S. Wilson, 15 Tremont street, Irvington, N. J.

H. M. Hughson & Company, Newark; mechanical engineers, machinists, tool makers, etc.; $25,000. Harry M. Hughson, 237 Halsey street, Otto H. Oppenheimer, 382 Frelinghuysen avenue, Arthur M. Lafayette, 382 Frelinghuysen avenue, Newark, N. J.

Boonton Rubber Manufacturing Company, manufacture rubber goods; $300,000. Richard P. Messiter; Frederick Gordon and Edwin A. Fisher, all Boonton, N. J.

Illinois.

Illinois Water Company, Delaware Corporation; operate water work; $500,000. W. R. Watson, 112 W. Adams street, Chicago.

E. Puttkamer Coal Company, Chicago; mining coal; $20,000. Kenneth B. Hawkins, Earl D. Hostette, Francis Adams, Jr., Chicago.

Southwestern Architectural Iron Company, Chicago; manufacture and erecting structural iron work; $10,000. Henry A. Hutson, William A. Sheehan, A M. Olson, Chicago.

Hight Manufacturing Company, Decatur; manufacture metal goods; $20,000. Robert L. Hight, Roy R. Wilson, A. B. Holabird, Decatur, Ill.

Kentucky.

P. & C. Manufacturing Company, Shelbyville; manufacture and sale of instruments and medicine; $12,000. George S. Chowning, W. S. Hackworth and May F. Rothchild.

PRICES OF COAL AND MATERIALS USED IN MINING COMPARED.*

By E. N. Zern.
Assistant Professor of Coal Mining, University of Pittsburgh School of Mines

OF seventy minerals mined in the United States, coal ranks lowest in the scale of value. In these days of protest against the high cost of living this is an enviable distinction. It has an additional distinction in that this industry is one of the few that have escaped investigation at the hands of one of the 25 committees appointed at the last session of Congress. The inference to be drawn is that there is no bituminous coal trust, hence no restraint of trade; and this inference is supported by facts.

In the first place, nature must be recognized as one of the great contributing factors to the low value of coal. She has bountifully provided for all sections of the country. In some of these, as in the Fairmont region of West Virginia, development can be carried on rapidly; low cost of production is favored by topographic and labor conditions. In other sections of West Virginia, and parts of the Pittsburgh and Connellsville regions, where shafting is necessary and labor is unionized, there is, of necessity, a large increase of cost over the more favored regions; but, on the whole, coal can be won cheaply—more cheaply than any other mineral which represents true mining conditions. This is the second great contributing factor to the low value of coal.

These two causes of low value are not alone peculiar to coal. Coal was merely one of many in nature's good graces; other commodities were equally favored. We are not satisfied, therefore, that the main factor has been found. In continuing the study of coal we find no greater anomaly than that its commercial value is the inverse of its economic value. In this latter respect it stands among the highest. Of such tremendous importance is coal that it controls absolutely the industrial activities of the United States. Shut down the bituminous mines of Pennsylvania, West Virginia and Ohio and the annual production of the country would decrease 60 per cent. This would paralyze the manufacturing industries, prostrate railroads and bring disaster to people dependent upon manufacturing, railroading, and mining, and in less than a month, to every city and village in the country. The supply being less than the demand, the price of coal would be exorbitant until an equilibrium was restored between the two. As long as this equilibrium was maintained prices of coal would equal the prices obtained to-day in England for it. Likewise, in our own country, it would approach in price those commodities whose equilibrium is maintained either artificially or naturally.

What is said of coal cannot be said of automobiles, kodaks, phonographs, billiard tables, etc., all of which may be

E. N. Zern.

classed as luxuries, and, in contradistinction with coal, are necessary only to the comforts of a few. A misfortune to the industries producing these articles would be a misfortune to a comparatively small number, not to humanity at large.

The production of coal, therefore, is of paramount importance to the welfare and comfort of society; and a corollary is that the man or body of men who undertake to satisfy this need should have a greater return for the money invested than is given to those who satisfy the cravings for luxuries. The difference in the nature of a mine investment, and a manufacturing investment makes this necessary. The former is temporary in nature; the latter permanent. If a mine has 20 years of life amortization of invested capital must take place in that time. To accomplish this, and include interest, the yearly return from a mine investment must be in excess of that returned from a manufacturing investment. If the return from the mining enterprise is not greater, nor even as great, there must be a clear-cut reason. If coal does not bring as great a return to capital as is brought by wood, grain, brick, oils, or other articles no more necessary to our every-day comfort and convenience than coal, there must be a well-defined cause. Let us see what the facts are.

The average selling price of all coal shipped in West Virginia for the fiscal year ending June 30, 1910, was 95 cents per gross ton. Since this is the same average price as was received during the year 1909 it is fair to assume that 95 cents gross is now the prevailing price of coal in that State. Ohio coal during the same period averaged 99 cents, and Pennsylvania coal about 95 cents.* While, therefore, the average price of mine-run coal to-day in the States of Pennsylvania, West Virginia, and Ohio is less than $1 per ton, it will be assumed, for the purpose of this paper, that $1 is the correct price, or cost value on cars.

In order to determine whether coal is fairly valued in comparison with other commodities, the writer has taken into account a few of the materials which enter as supplies into mine operation; has compared their value at point of production with the value of coal on the cars, the ton in all cases being taken as the unit of comparison. Such a method is obviously, open to criticism. In making comparisons it is not claimed to have taken into account minute details, or to have gone into niceties which should enter into a more elaborate treatment of the subject; but, though this ommission has been made, let it be understood that coal has not only the same charge accounts as a manufacturing industry in its investment, raw material, labor, and repairs, but, in addition, it has infinitely greater problems to face and risks to assume. In the last analysis, the value of a product is largely a matter of output. Gold would be less valuable than iron if nature had as lavishly bestowed it and if production was as large. The purpose of this paper will be fulfilled if it succeeds in showing that there exists a wide and, in an economic sense, unjustifiable difference between the value of coal and that of other commodities. The selected materials have been grouped as follows:

Group A—A mine specifying 8-foot props and 16 square inches at the small end uses in each prop an average of 35 pounds of wood. At 12 cents each a ton of props has a value of $6.86. At prevailing prices of hay, corn and oats, the farmer receives $20, $26.79 and $28.13 per ton respectively. The four items in-

*Average prices for coal in these three States as given by the U. S. Geological Survey are, respectively, 92 cents, $1.05, and $1.02.—Editor.

volve no mining, only a slight amount of manufacture or preparation, and the raw material, in this case synonymous with the finished product, is easily obtained.

Group B—Sawed oak, such as is used for timbering shafts, haulage ways, and tipple construction, at $30 per thousand board feet represents $12 per ton. The [illegible] for tamping holes at four cents per pound totals $80 per ton. The mine must produce 3⅓ tons of coal to equal in value a corresponding amount of ice, used in the office cooler. Three items, like those in Group A, involve no mining, but more expense in manufacture or preparation, the raw material being easily obtained.

Group C—Safety powders at 10½ cents per pound will value $205 per ton while black powder at 5 cents has the more modest total of $100 per ton. Steel rails continue at the old price of $28 per ton. Brick at $6 per thousand, and averaging 4¼ pounds each, means an expenditure of $2.82 for each ton used in stoppings, overcasts, etc. Cement, 376 pounds to the barrel, at 80 cents per barrel, brings to the cement industry $4.25 per ton. In these four items the processes of mining and manufacture are combined in varying proportions, more capital is required, and the risk is greater.

Group D—Lime for the past year averaged to the burners $3.20 per ton. Motor sand varies from 75 cents per ton for engine-sand to $1.05 per ton for a good grade of white sand. Crushed stone, such as is used in making concrete, yields the quarryman 60 cents per ton, and is rising yearly in value. Roofing slate at the average price of $3.75 per square brings to the slate industry $11.54 per ton. Cylinder oil at 30 cents per gallon, and engine oil at 16 cents per gallon, represent $79.36 and $41.40 per ton respectively. Naphtha, or gasoline, at 12 cents per gallon, and chain-machine oil at 10 cents per gallon, total $34 and $25.19 per ton, while pit-car oil, which corresponds to coal slack, now selling at 35 cents to 50 cents—or anything that's offered—has an exalted importance at $19.16 per ton. The items in this group are analogous to coal mostly in the fact that they are won by mining. They require some preparation before being placed on the market; but the capital required is not so great as that involved in Group C.

Even nature obliges an expenditure for the use of her air. A mine using 120,000 cubic feet of air per minute pays six cents for each ton of air delivered into the mine. Such a refreshingly low rate is an oasis in the desert; but the secret of it is that the air is only loaned for the purpose of ventilation on condition

Wanted, For Sale, Bargains.

Want and For Sale advertisements published in these columns, one cent a word. No advertisement taken less than 25 cents.

WANTED

WANTED — 1 yard crane, about 75-foot span, 250 volt, 3 motor lift, with about 300 feet of runway. Address Industrial World, Box 10 A, 108 Smithfield St., Pittsburgh, Pa.

WANTED — Salesman for Cement Coated Nails. Must have had experience. Give reference, name and salary. All communications strictly confidential. American Steel Company, Park Building, Pittsburgh, Pa.

WANTED—Bright, energetic young man, to act as assistant to manager of a malleable iron plant. Must be a good correspondent and familiar with costs in this business. Address Box A, the Industrial World, 108 Smithfield street, Pittsburgh, Pa.

WANTED — A 40-kw. belt-driven generator, a complete ice plant with capacity of 30 to 50 tons daily, and an 8-inch pipe cutting and threading machine. Address No. 12, Care the Industrial World, Pittsburgh, Pa.

WANTED—Messrs. R. & G. Hislop, gas and heating engineers, Paisley, Scotland, who are the best known specialists for heating of stoves and furnaces with producer gas are ready to deal with a "capital" firm who could handle their plant in the States. Adopted by the leading firms, 25 per cent saving in fuel.

WANTED—Foundry foreman for jobbing foundry. Must be capable of handling variety of work in foundry melting two tons per day. Address Cadillac Machine Company, Cadillac, Mich.

WANTED—A thorough competent foreman for the mounting, plating and steel range department of our stove plant. Apply with references and full particulars to the Enterprise Foundry Company, Sackville, N. B.

WANTED—Works manager, with mechanical knowledge for plant employing three hundred men. Must be good organizer, forceful, and be able to initiate improvements in machinery, machine, forge, plate and structural shops embraced in plant. Manitoba Bridge & Iron Works, Limited, Winnipeg, Canada.

WANTED—Chief draftsman acquainted with crane and hoist construction. One who can give positive evidence of ability can secure permanent and satisfactory position. Address Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

WANTED — A man who understands the manufacture of high grade parting. Address F. C. Adams, 702 West Division street, Chicago.

WANTED — Experienced Salesman to sell pumps to the hardware trade of the Southwest; an opportunity to the man of ability to make a handsome salary. None but salesmen need apply. Address The E. Z. Force Pump Company, Winston Salem, N. C.

WANTED — A good live Salesman to represent Eastern concern manufacturing screw machine product. Address P. O. Box 1165, Springfield, Mass.

WANTED — Inquiries to purchase or sell iron, steel, metals, machinery, contractors' equipment, iron buildings, and bridges. Address Thomas J. Pope, 59 Beekman street, New York.

Want and For Sale advertisements published in these columns, one cent a word. No advertisement taken less than 25 cents.

POSITIONS WANTED

WANTED — Ambitious and Capable young married man wants position with good live, substantial company, manufacturing iron, steel, machinery or allied trades, where there is good opportunity for advancement in either Sales or Executive Departments. Willing to work in shops if necessary, to gain essential knowledge. Address Box 222, Oakmont, Pa.

ASSISTANTS WANTED

WANTED—First-class man to take charge of annealing room. Must be able to handle men and produce results. Give references and salary expected. Address Box 94, Syracuse, N. Y.

WANTED—An established manufacturing concern (users of cast iron), lately reorganized, purpose building their own foundry. An exceptional chance for up-to-date energetic foundryman of thorough practical experience, to manage and secure financial interest and with A-1 people. Best references given and required. Address P. O. Box 465, Albany, N. Y.

FOR SALE

SALE BY TENDER.

Tenders will be received by the undersigned until November 1, 1911, for the purchase of Land, Buildings, Plant, Machinery, Tools, Dies, Stock in Trade and Good Will of the Rapid Tool Company, Limited, insolvent, of Peterbborough, Ont., formerly carrying on business as manufacturers of Auger-Bits, etc. Full particulars may be had upon application. W. R. Morris, Assignee, 375 Water street, Peterborough, Ont., Canada.

FOR SALE—The drawings and patterns of a line of metal working machinery, sufficient to equip completely, Steel Plants, Rolling Mills, Tube Mills, Spring Works, Bridge Works, Boiler Shops, and Plate-Glass Plants. The engineering and selling talent also is available. Address Engineer, care the Industrial World, 108 Smithfield street, Pittsburgh, Pa.

HYDRAULIC WHEEL PRESSES
29 Sizes. Capacities 50 to 400 tons
AIR COOLED AIR COMPRESSORS
6 Sizes. Capacities 4 cubic feet to 25 cubic feet.
Write for catalogues and prices.
E. R. CALDWELL & CO., Bradford, Pa.

BESSEMER GAS ENGINE BARGAIN

2—125 H. P. Twin Cylinder.
1— 60 H. P. Single Cylinder.
All in first-class condition.
Can give immediate delivery.

Best Manufacturing Co.,
Pittsburgh, Pa.
(Phone Oakmont 280.)

that it is to be returned as promptly as possible.

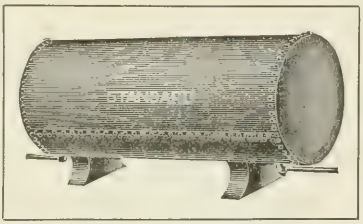
The items in all the groups greatly exceed in value that of coal. However, it is not charged that the timber, agricultural, powder, steel, cement and other industries, conscious of their greater vitility, are holding up the bedraggled coal industry; but if their values are just—and who amongst us shall say they are not—what about the value of coal? If props and oak, the manufacture of which is carried on in God's free and fresh air with no excessive risk of capital involved have a value 7 to 12 times that of coal, the question naturally arises—Why? The farmer resents the imputation that his tonnage prices are excessive. He must assume risks of drought, etc, but his bank account shows that 25 to 1 is a comfortable ratio of values.

The items under Group C show a varied result. The manufacture of powder involves great risk. Some powder mills have been known to blow up. In this respect they resemble coal mines; but when such catastrophes do occur the value ratio of 100-205 to 1 takes better care of them than it does of the mine owner. Rails involve mining, transportation of ore from the mines to the steel mills, and a considerable amount of treatment and manufacture. It is said that the rails from the Pittsburgh mills have sold in Europe at bargain prices; but the value ratio in this country remains at 28 to 1. The brick and cement industries are putting out a comparatively cheap product. Cement has decreased 20 per cent in value in ten years; the symptoms in its disease are very similar to those of coal's disease. Ice at 3½ times the value of coal at once raises a query why the article that keeps the butter hard is of more value than the article that cooks the meal.

Passing on to the next group, we are astonished at the cheapness of stone and sand. While less in value than coal, the simplicity of their extraction as compared with coal only aids in showing the discrepancy in values. Our vision of cheapness is at once dispelled when contemplating oils. Cylinder oil is major at $79.36, and pit-car oil minor at $19.16. From a bore-hole, almost infinitely small in size and expense of sinking when compared with two or three shafts, is extracted mineral so similar to coal that they are ascribed the same origin by many geologists; but this value is 14 to 79 times that of coal. To be sure, a prospect may turn out to be a duster; the crude oil must have preparation, and there are transportation charges; but all this, and much more, can be said of coal; and if the value of oil is just, what of the values of coal?

How then does coal seek its level at

KNOX PRESSED and WELDED
. . . STEEL COMPANY . . .
MANUFACTURERS OF ALL CLASSES OF
STEEL PLATE CONSTRUCTION - WELDED STEEL SPECIALTIES
OFFICE: FARMERS BANK BUILDING, PITTSBURGH, PA. WORKS: NILES, OHIO.
Sole manufacturers of Knox Patented Water Cooled Parts, Doors and Door Frames for Open Hearth Furnaces.



Standard Tanks for any purpose: Water, Air, Oil, Gas. We guarantee every tank absolutely tight and all openings plugged for shipment, keeping the tank clean and the tappings free from injury.
We are manufacturers of all kind of Plate Construction, Stand Pipes, Self Supporting Stacks, Accumulators and Air Receivers; also Freezing Tanks and Drip Pans for ice plants.
Write for price lists on Pneumatic Steel Tanks, Air Receivers and Oil Storage Tanks, which we carry in stock ready for immediate shipment. We can also quote you attractive prices on your special requirements.
STANDARD STEEL TANK & MFG. COMPANY
Works: Girard, O. PITTSBURGH, PA.

NEW YORK PITTSBURGH CHICAGO
OTIS ELEVATOR COMPANY
ELECTRIC AND STEAM
AUTOMATIC
Hoisting and Reversing Engines
NEW AND REFITTED. Full Description on Reque

COLD DRAWN STEEL SHAFTING
Screw Stock—Flats—Squares—Special Shapes
Finished Machine Keys—Machine Rack
Crank Shafts—Connecting Rods
ALL WORK FINISHED TO A HIGH DEGREE OF ACCURACY
STANDARD GAUGE STEEL COMPANY
BEAVER FALLS, PA.

SAMUEL TRETHEWEY & CO., Ltd.
ROTARY, STRAIGHT and ANGLE
SOLID STEEL SHEAR KNIVES
Roll-Turning Tools,
Roll-Turning Plugs,
Special Blanking Die
47th St., Pittsburgh, Pa

$1.00 per ton? Mainly by virtue of the fact that the coal industry has developed more rapidly than the industries upon which it is dependent. Growth came easily, because nature placed no great obstacle in the way. New fields have been placed in competition with older fields, and prices are forced to the level of the centres of cheapest production. Too much competition, says the coal operator; competition is an excellent thing, says the Sherman anti-trust law; but the fact remains that over production is the third and greatest contributing factor to the low value of coal

Over production is not common to all commodities. The farmer does not produce 1,000 to 2,000 tons of grain per day; neither does the powder plant or the paper mill have daily outputs in four figures. This is reflected in the value of their products. Lumber mills and slate quarries have a higher daily rate of production, and their products average less than half in value those of the farmer. Brick, cement, lime, stone, sand and ice are cheap to produce, because daily tonnage is large per man employed; the value per ton is therefore small. Oils are plentiful; the supply is in excess of the demand. The daily production at some wells, in Louisiana for example, is remarkably large; in the older districts it is very small; but there has never been a dearth of oil, and a good producer today is as desirable as a gold mine. Why the price of oil has not yielded to the same fluctuations as coal is not pertinent to our purposes; full details can be found in the United States Supreme Court decisions.

The future will provide a more equitable price for coal. Whether it will come by continuing hopeful that something or other will arise to restrain production and prices will automatically seek a higher level, or whether by instrumentalities within the pale of the Sherman law, is not for the layman to say. If some contingency should arise which would force operators to cease mining simply for pastime, cease making "record" outputs irrespective of profits, and cease mining merely because coal easily won would be a benefit not only to our generation but to generations to come. If the signs of the times are correct the pipers bill is rapidly coming due, and some one will have to pay him. A solution to the problem is inevitable, even if it comes through operation of the remorseless law of the "survival of the fittest."

Much can be learned from other industries. The farmer has seen his produce increase yearly in value. He enjoys a situation where there is neither willful waste nor woeful want of his grains. Experience has taught him that it profiteth a man more to raise 100 or

Highest Grades Phosphor Bronze, Monel Metal and German Silver
IN RODS, SHEETS AND WIRE
Manufactured by SHIMER, McGLYNN & CO., Inc.
In their new and up-to-date mill. Correspondence solicited.
SHIMER & CO., Inc., Selling Agents, Bullitt Building, PHILADELPHIA, PA.
Pittsburgh Office: OLIVER BUILDING.

ALEX. LAUGHLIN & CO.,
Engineers & Contractors,
PITTSBURGH, PA.
Builders of Every Description of
FURNACES AND GAS PRODUCERS
—FOR—
IRON AND STEEL WORKS.

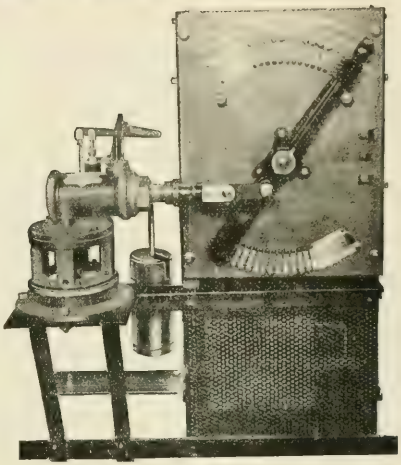
C. O. BARTLETT AND SNOW CO.
MAKERS OF CLEVELAND, O. U.S.A.
PICKING TABLES
ELEVATORS AND CONVEYORS.

T. D. MALONEY & SON,
3300 Second Avenue,
PITTSBURGH, PA.
Phones Bell, Grant 3109-J. Hemlock 458-R. P. & A., 1321-K.
Manufacturers of
BREEZE COKE
—FOR—
Forging Purposes

LOCOMOTIVE CRANES
Railway Wrecking Cranes and Pile Drivers, Freight Station Transfer and Pillar Cranes, Transfer Tables.
INDUSTRIAL WORKS,
BAY CITY, :: MICHIGAN.
New York Office—50 Church Street.
George H. Newhall Engineering Company Philadelphia.
J. G. Miller, St. Louis, Mo.
F. H. Hopkins & Company, Montreal, Can.

CUTLER-HAMMER

Automatic Regulation of Forced Draft Systems



The controller illustrated is designed for use in connection with electric motors operating on forced draft systems, gas pressure blower systems, etc.

On boiler draft systems it adjusts the speed of the motor and the blower driven by it to the number of revolutions per minute necessary to furnish the amount of draft required for a given demand on the boiler.

Any variation in boiler pressure results in automatic increase or decrease of motor speed, regulating the draft so that the boiler pressure remains constant.

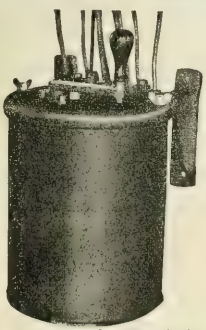
Where sudden and frequent variations in load occur, this automatic regulator is especially necessary. No attention after adjustment is required. More or less draft is provided as needed.

These regulators are also used for controlling oil pumps, feeding oil to oil-burning boilers, and for numerous other uses where an automatic regulation or maintenance of gaseous or liquid pressure is desired.

This type of regulator can be furnished for D. C. Motors, single-phase A. C. repulsion motors, and two and three phase A. C. slip ring motors.

Write for a copy of our 16-page pamphlet, which describes and illustrates this regulator.

A. C. Motor Starters



Auto-Transformer · starter for squirrel-cage motors.

The complete line of Cutler-Hammer A. C. motor starting devices practically duplicates the D. C. lines. For single-phase or poly-phase, slip ring or squirrel-cage type we can provide manually or automatically-operated starters.

Our standard types of A. C. speed regulators and controllers cover every possible application.

Catalog sent on request.

Machine Tool Coutrollers

Cutler - Hammer controllers, made for every kind of machine tool service, are the result of 20 years of experience in the design and manufacture of electric controlling devices. They are of "service-proven" construction and have the backing of the largest manufacturer of this line of apparatus in the world.

Let us advise you as to the proper device for your case and send you descriptive Bulletins.

Full Reverse Drum Type Motor Controller.

THE CUTLER-HAMMER MFG. CO. MILWAUKEE

NEW YORK: Hudson Terminal 50 Church Street CHICAGO: Peoples Gas Bldg. PITTSBURG: Farmers' Bank Building
BOSTON: 176 Federal Street PHILADELPHIA: 1201 Chestnut Street CLEVELAND: Schofield Building
PACIFIC COAST AGENTS: Otis & Squires, 579 Howard St., SAN FRANCISCO, 229 Sherlock Building, PORTLAND, ORE.
and W. B. Palmer, 416 E. 3rd St., LOS ANGELES.

1,000 tons per year at a good price than to raise the same quantity daily at a selling price equal to the cost of production. Coal must attain a commercial value in proportion to its industrial value. So long as the coal operator is obliged to witness, throughout the "patch," the distribution of beer, bringing to the brewer $79.00 per ton, while his product yields only $1.00 per ton, although it is capable of bringing incomparably greater good and happiness to society, of providing employment to a vastly larger army of men, and involving more capital and risks than is common to brewing—so long as the operator sees this, he will continue to believe that the values of commodities are in need of a thorough revision.

Dwindling Supply of Ties.

The story has been told often of how the demand of the railroads for tie timber is steadily diminishing the supply, and of the danger that must be faced some day when there will not be sufficient supply to meet urgent requirements. But this deals with the roads as a whole. When the situation is analyzed and the needs of one of them is known it serves as a strong illustration of how the ties wear out in spite of the methods in use to-day for increasing their life and so diminishing the incessant call for more material.

With regard to this matter of illustration, data from a statistical report of the maintenance of way department of the Southern Pacific serves the purpose in an exceptional way. For instance one-seventh of the 25,125,000 ties that are in the Pacific system have to be removed and replaced every year. Previous to their use these new ties are subjected to creosoting, or a chemical preparation known as the burnettizing treatment for their preservation,

At the renewal rate named, which means an average of 2,800 ties to the mile, more than 240 miles of the Southern Pacific's roadbed is rebuilt every 12 months. During the last 10 years, 20,000,490 ties were taken up and replaced with others of fir, pine, cedar and redwood.

The Burnettizing process consists of forcing chloride of zinc into the wood cells after a vacuum treatment, preceding which the ties are steamed in a cylinder for the purpose of softening the cells. The vacuum extracts the sap and water. All this takes about a half day to complete and then comes the outdoor drying in the sun. When creosoting is done, the only difference is the use of dead oil of coal tar instead of the zinc solution.

Four spikes and two tie plates are required in putting down each tie and fast-

UNITED STATES
Cast Iron Pipe & Foundry Company.
OPERATING 11 PLANTS.
WATER, GAS & CULVERT.
General Offices and Eastern Sales Office: 71 Broadway, New York.
PHILADELPHIA SALES OFFICE: 1421 Chestnut Street, Philadelphia, Pa.
WESTERN SALES OFFICE: 217 La Salle Street, Chicago, Ill.
SOUTHERN SALES OFFICE: Chamberlain Bldg., Chattanooga, Tenn.
PACIFIC SALES OFFICE: Monadnock Bldg., San Francisco, Calif.,
PITTSBURGH OFFICE: Henry W. Oliver Building.
Bell and Spigot Specials. Flanged Specials. Flanged Pipe. Flexible Joint Pipe.

We have had ten years experience as a crane building firm and over twenty years as individuals—constantly studying to improve crane design and construction. We have added again and again to our plant and can give you the best to be found in crane practice. Ask about our patent Type E. Electric traveling crane.
"You will search in vain for a better Crane" Ask Users

NORTHERN CRANES
E. E. BROSIUS, Agt., Machesney Bldg., Pittsburgh, Pa. Phone 3574 Court
NORTHERN ENGINEERING WORKS. DETROIT, MICH. U.S.A.
Electric Hoists

THE MEEHAN BOILER & CONSTRUCTION COMPANY
LOWELLVILLE, OHIO.
Manufacturers and Erectors.
STEEL PLATE WORK
BLAST FURNACES, HOT BLAST STOVES, GAS WASHERS, CAR TANKS, WATER TANKS, STEEL RIVETED PIPE, SELF SUPPORTING STEEL STACKS, STAND PIPES, STORAGE TANKS

RIEHLE TESTING MACHINE,
Testing Machines for all kinds of Tests
Testing Appliances for Physical Laboratories, Marble Machines, Riehle Robie Patent Screw Jacks, etc., etc.
RIEHLE BROTHERS TESTING MACHINE COMPANY
1424 NORTH NINTH STREET, PHILADELPHIA. NEW YORK OFFICE: 120 LIBERTY STREET

The S. R. SMYTHE COMPANY,
ENGINEERS AND CONTRACTORS
Steel Works, Rolling Mills, Blast Furnaces, Hot Blast Stoves, Etc. Furnaces for All Purposes.
Gas Producers For Fuel and Power Applied for All Purposes.
House Building, ESTABLISHED 1879 PITTSBURGH, PA.

ening the rails to it. By a little mathamatical calculation it will be found that 101,000,000 spikes and 50,900,000 tie plates are in the Pacific system of the Southern Pacific. Each of the plates weighs 6½ pounds and each spike a half pound, making a total of 681,950,000 pounds of metal attached to the ties, not counting, of course, the rails which weigh 90 pounds to the yard, and numerous tie rods.

TO BRIDGE JAPANESE STRAIT.

Costly Structure Is Under Construction by Mikado's Government.

[Report by U. S. Consul General Thomas Sammons, Yokohama.]

With reference to the proposed $7,500,000 bridge across the Straits of Shimonoseki (referred to by Consul Deichman in Daily Consular and Trade Reports for November 7, 1911), it appears that the Japanese government, in its engineering studies, is acting along lines separate from those conducted by private individuals, and as yet no definite plan of procedure has been agreed upon. H. Horiuchi, of the purchasing department of the Imperial Railways of Japan, address, Tokyo, informs me that the bridge plans of the railway board are in the hands of the chief of the department of technology, Imperial University, Mr. T. Hiroi.

A party of Osaka business men is also considering forming a company to build this bridge; the bridge plans of this proposed company were drawn by the Murakami Architect Company (now the Osaka Engineering Company), and I understand a copy of this plan was sent to the inventor of the Force Bridge System, in England.

Mr. Horiuchi gives it as his opinion that the style of bridge most likely to be adopted is the cantilever bridge of the Force Bridge System. The proposed bridge is to act as a connecting link between the Sanyo and the Kyushu Railway systems, as well as for general traffic. The length of the bridge, which is to be constructed at the narrowest point of the straits, will be about 3,890 feet, and it is anticipated that the standard gauge tracks will be utilized. It is probable that electricity will be used as a motor power. It is estimated that daily receipts for freight and passenger carriage will amount to $1,850 a day, and that of this $250 per day would be required for working expenses.

Ferries are now used, and it is estimated that 5,000 tons of merchandise are moved daily.

Brick and tile output of U. S. 1909, was $92,776,000.

ROGERS, BROWN & CO.
Cincinnati Chicago St. Louis
New York Philadelphia Cleveland Birmingham
Buffalo Pittsburgh Boston
PIG IRON
COKE
"Every Possible Kind for Every Possible Purpose"

CHILLED and SAND ROLLS
Blooming, Bar, Sheet and Tin Mills Complete
WHEELING MOLD & FOUNDRY CO
Pittsburgh Office; 823 Farmers Bank Building. WHEELING W. VA

BAIRD MACHINERY COMPANY,
MACHINE TOOLS of all kinds for the Machine Shop, Foundry, Planing Mill, Pattern Shop, &c., &c. Machinists' Tools and Supplies.
LARGE STOCK SECOND-HAND MACHINERY.
WRITE FOR LIST.
Ware Rooms and Offices: 123-125 Water St.,
Second hand Department: Cor. 23d and Smallman Sts, Pittsburgh Pa.
WATSON-STILLMAN CO., HYDRAULIC PRESSES.

HEPPENSTALL FORGE & KNIFE CO.,
Forty-Seventh St., and A. V. R. R., Pittsburgh, Pa.
Successors to Pittsburgh Shear Knife & Machine Company.
We are now Making a Specialty of
Forgings and Shear Knives
Of Every Description, Your Inquiries Solicited.
HEPPENSTALL FORGE & KNIFE CO.

CHAMBERSBURG
STEAM HAMMERS
Single Frame—Double Frame—Drops
HYDRAULIC FORGING and FLANGING PRESSES
Riveters—Cranes—Pumps—Accumulators
CHAMBERSBURG ENGINEERING COMPANY, Chambersburg, Pa.

HEMATITE ORES
Complete plants for washing and preparing; these at least cost.
ORE WASHERS - - - - - - wood or Steel logs
ORE JIGS - - - - - - for hard service
Revolving Screens, Conveyors and Elevators.
WRITE FOR CATALOGUE
McLANAHAN-STONE MACHINE CO., HOLLIDAYSBURG, PA.

NATURAL CEMENT VS. PORTLAND CEMENT: U. S. GEOLOGICAL SURVEY'S ANALYSIS.

THE rise and fall of the natural cement industry in the United States is shown by Ernest F. Burchard, of the United States Geological Survey, in "The Cement Industry in 1910," recently issued by the Survey as an advance chapter of "Mineral Resources for 1910." A dozen years ago the production of natural cement was nearly 10,000,000 barrels; last year it was but 1,139,239 barrels. It seems that it is a case of the survival of the fittest and Portland cement has largely displaced natural cement. The following table tells the story:

Production of Portland and natural cement in the United States, 1899-1910 (in barrels).

Year.	Portland Cement	Natural Cement
1899	5,652,266	9,868,179
1901	12,711,225	7,084,823
1903	22,342,973	7,030,271
1905	35,246,812	4,473,049
1907	48,785,390	2,887,700
1909	64,991,431	1,537,638
1910	76,549,951	1,139,239

Natural cements differ from Portland cements in the following important particulars:

Natural cements are not made from carefully prepared and finely-ground artificial mixtures, but from natural limestone rock.

Natural cements are burned at a lower temperature than Portland, the mass in the kiln never being heated high enough even to approach the fusing or clinkering point.

Natural cements, after burning and grinding, are usually yellow to brown in color, and light in weight, having a specific gravity of 2.7 to 3.1—that is, the cements weigh from 2.7 to 3.1 times the weight of water. Portland cement is commonly blue to gray in color and heavier, its specific gravity ranging from 3 to 3.2.

Natural cements set more rapidly than Portland cement, but do not attain so high tensile strength.

Portland cement is a definite product, its percentages of lime, silica, alumina, and iron oxide varying only between narrow limits, while brands of natural cements vary greatly in composition.

The future of the natural-cement industry, according to Mr. Burchard, seems to depend on means of improvement in the manufacture of the cement, chemically or by better mechanical devices, whereby it may be brought nearer to the specifications for high-grade Portland cement. The decline in the use of natural cement has been due principally to the greater tensile strength of Portland cement. At long periods, as shown by many records, the two cements in sand mortars show practically equal results. Natural cement has hydraulic properties—that is, if properly prepared it will set under water.

A copy of Mr. Burchard's report can be obtained on application to the director, U. S. Geological Survey, Washington, D. C.

Electric Furnace Data From Sweden.

The Bureau of Manufactures at Washington announces that Consul Thomas H. Norton, of Chemnitz, Germany, on special detail investigating chemical industries, has forwarded a comprehensive report on the electric furnace at Trollhatten, Sweden. The report includes a brief history of electric smelting, a full description of the Trollhatten furnace

IMMEDIATE SHIPMENTS

OF

Beams, Channels, Angles, Tees, Sheared and Universal Plates, Checkered Plates, Rounds, Flats, and Squares. Plain Rounds, Squares and Cold Twisted Squares for Concrete Reinforcement.

FROM

WAVERLY WAREHOUSES, Newark, N. J.
PITTSBURG WAREHOUSE, Pittsburg, Pa.
CLEVELAND WAREHOUSE, Cleveland, O.

ADDRESS THE ONE NEAREST YOU, OR

CARNEGIE STEEL COMPANY

General Offices, Pittsburg, Pa.

Export Representatives
United States Steel Products Co., New York.

Pacific Coast Representatives
United States Steel Products Company
Los Angeles San Francisco
Portland Seattle

Birmingham
Boston
Buffalo
Chicago
Cincinnati

District Offices
Cleveland New York
Denver Pittsburgh
Detroit St. Louis
New Orleans St. Paul
Philadelphia

STOCK LIST SENT ON REQUEST.

and the results of its operation, and an interesting resume of the advantages to be gained by the more general adoption of electric smelting in America. The report will be loaned to interested persons and firms upon application to the Bureau of Manufactures.

OUTPUT OF MAGNESITE.

Geological Survey Predicts Opening of Panama Canal Will Make California Deposits available for Consumption in the East.

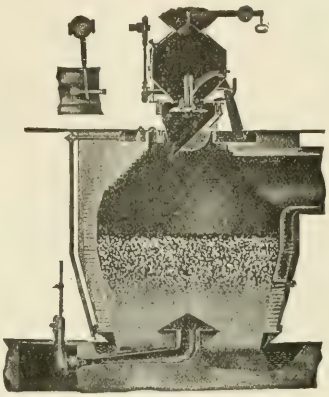
The value of crude magnesite mined in 1910 ($74,658) is almost twice that of the production in 1909, according to Charles G. Yale in his report on magnesite issued by the United States Geological Survey as an advance chapter from "Mineral Resources of the United States" for 1910. While the production of the crude ore has materially increased, the rapid rise in value is due to the constantly growing demand for the calcined product. No crude ore is offered for sale, but after being calcined the output is used mainly in manufacturing paper from wood pulp; it is also used in making artificial stone, fireproof flooring and tiling, and in brick or plaster form for lining furnaces and covering steam pipes. The entire front of one large building in San Francisco was recently constructed of molded calcined magnesite in blocks and ornaments. The material was first calcined and then ground to a fine powder and was then made into a plastic cement and molded in the desire forms. The fine waste of the crude ore mined is now being utilized at California chicken ranches as a substitute for oyster shells and other substances fed to fowls for hardening the eggshells.

California the Only Producer.

The only deposits of magnesite in the United States which have been commercially utilized are those situated in the valley and coast counties of California, and the entire output is consumed on the Pacific coast, the cost of transportation to points east of the Rocky Mountains being prohibitive. It is for this reason that large quantities of raw and calcined magnesite continue to be imported from Greece, Hungary and other countries, and imports increasing each year. It is the belief of Frank L. Hess, of the Geological Survey, who has made a study of the California deposits, that the opening of the Panama Canal will bring the California magnesite into successful competition in the entire United States with the imported product.

According to Mr. Yale's figures the imports of magnesia and magnesite, both calcined and crude, for 1910, amounted to 356,512,243 pounds, valued at $1,578,-

MORGAN CONTINUOUS GAS PRODUCER



"THE STANDARD IN BOTH EUROPE AND THE UNITED STATES."

DYBLIE REVERSING VALVES ARE INDESTRUCTIBLE.

MORGAN CONSTRUCTION CO., :: Worcester, Mass.
European Office 52 Rue du Congres, Brussells.

JESSOP'S STEEL

Manufactured in Sheffield, England.
To Secure Good Results Buy it For Tools, Mining Drills, etc
Wm. Jessop & Sons, Inc.
91 John St. New York.

ARK.

JESSOP'S "ARK" HIGH-SPEED STEEL IS THE VERY BEST IN THE MARKET.

Phillips Mine and Mill Supply Company.
WHEELS, ALL STYLES
FOR
MILL TRUCKS.
PITTSBURGH, - - - - - - PA.

W. N. KRATZER & CO. Manufacturers
STRUCTURAL STEEL WORK
Buildings, Bridges, Roof Trusses, Girders, Columns, Builders' Iron Work
Beams, Channels, Angles, Zee Bars, Etc.
3212 to 3232 SMALLMAN STREET, :: :: PITTSBURGH, PA.

Don't Take Chain Chances

With every order for Jones & Laughlin Steel Chain you may have a certificate stating that it has been tested to the proof strains required by the American Ship Master's Association. Untested chain may incur accident and heavy losses. Why take chances?

Send now for illustrated Catalog "C"

We make all kinds of chains and the material that goes into them is rolled in our own mills from steel made in our own works where we control every process from mining the iron ore to testing the chains.

Other J. & L. Products

Open Hearth and Bessemer Steel, Steel Sheet Piling, Power Transmission Machinery, Cold Rolled Shafting, Rope Drives, Concrete Reinforcing Bars, Steel Wire Nails, Barbed Wire, Fence and Special Screw Wire, Tinplate, Railroad Spikes, Light Rails and Connections, Steel Mine Ties, Structural Steel.

JONES & LAUGHLIN STEEL COMPANY

American Iron and Steel Works
PITTSBURGH

SALES OFFICES:

ATLANTA, Fourth Nat. Bank Bldg.
BOSTON, 131 State Street
BUFFALO, White Bldg.
CHICAGO, Lake and Canal Sts.
CINCINNATI, Union Trust Bldg.
CLEVELAND, Rockefeller Bldg.
DETROIT, 810 Penobscot Bldg.
NEW YORK, 165 Broadway
PHILADELPHIA, Arcade Bldg.
PITTSBURGH, Jones & Laughlin Bldg.
SAN FRANCISCO, Crocker Bldg.
ST. LOUIS, Pierce Bldg.

104

683, an increase of 121,072,377 pounds, with a value of $537,265 over the amount imported in 1909. A copy of the report on magnesite can be obtained on application to the Director of the Geological Survey, Washington, D. C.

A FOUNDRY FOR CHILLED CASTINGS.

DESCRIBING one of the foundry designs he has developed, George K. Hooper, of the Hooper-Falkenau Engineering Company, New York, gives the following account of a type of foundry in which growth of the plant in two directions is provided for. He says:

A type covering several classes of large work is designed to grow in two directions, being devoted to a large amount of chilled work. The melting equipment, including air furnaces, is located in the center of the building, and the space immediately in front is occupied by the ladle and chill storage and ladle-making departments. Inasmuch as the molds for the sections made in this plant are cast on end, a proportionately greater tonnage can be secured from a limited floor space, as compared with a plant where floor molding is done exclusively. Considerable room is required in a shop of this kind for handling ladles. Separate power cranes are also required for each pit and liberal head room is necessary. The floor about the pits in front of the drying ovens should be made of concrete. The growth of the other end of the plant devoted to the production of general castings will be siimlar to that of the large foundry already described.

A plant of this kind may be divided into three or more bays, the furnaces being so located that they are accessible to the main bay cranes. The stock house and iron storage may be located as previously explained. The charging floor, on account of the cupolas necessary to supply all of the mixtures required, should be served by an overhead crane which can carry large pieces of scrap and carloads of pig iron to any cupola or furnace.

While the area required per molder in lighter gray iron work may be as great or even greater than in heavier work, the tonnage handled is proportionately much smaller. Frequently no overhead equipment is required, tracks or trucks being amply sufficient for handling the iron. Certain floors may require comparatively large amounts of iron and separate handling appliances, but in general the buildings will be divided into bays, with the melting done at one end or one side and the cleaning department directly opposite. The pickling department should be located away from the natural line of growth so that extensions will not disturb this department. For this class of work the core room can be established at a distance from the foundry and it is not essential to have it directly in or adjacent to the foundry building.

The stock sheds and iron storage should, of course, be convenient to the melting department and the overhead crane is not essential to the iron yard. Tracks and cars connecting with the elevator are as economical as a yard crane, when all of the handling is considered. A separate building should also be provided for the storage and repair of molding machines.

In a foundry of this type it will be found necessary to install light overhead

STRONG DURABLE
THE STANDARD SCALE & SUPPLY COMPANY
Manufacturers of
WEIGHING AND MIXING MACHINERY
"The Standard" Scales—Eclipse Concrete Mixers
Headquarters and General Offices, PITTSBURGH, PA.
Manufacturing Plant at BEAVER FALLS, PA.
PITTSBURGH 243-245 Water St.
CHICAGO 1345-47 Wabash Ave.
NEW YORK 136 W. Broadway
CLEVELAND 1547 Columbus Road
PHILADELPHIA 35 S. Fourth St.
RELIABLE SIMPLE

Ask the Expert

¶ If you are having trouble with your power plant and find your power is costing more than it should, Call 3200 Grant, Contract Department, and have one of our power expert help you solve the problem. His services and advice will cost you nothing.

The Allegheny County Light Co.

435 Sixth Avenue, Pittsburgh, Pa.

travelers which can serve either the molders or the machines and which, in any event, can handle the iron. Considerable space is also necessary in a plant of this kind for stacking flasks, as it is not practical to have a large flask yard or to build a separate structure for them. Galleries can be used very well as storage room.

AMERICAN ENGINEERING CO

A Consolidation of Windlass, Rope Drive and Stoker Concerns.

Announcement is made of the consolidation of Wiliamson Brothers Company, of Philadelphia, and the American Ship Windlass Company and Taylor Stoker Company, formerly of Providence, R. I., under the title "American Engineering Company," with works and executive offices at Philadelphia, Pa.

The first steps in this consolidation were taken when in 1906 Williamson Brothers Company purchased control of the American Ship Windlass Company with the intention of gradually combining the business of the two concerns in the line of marine products. This offered an opportunity for definite widening of of the field of activity, for the apparatus manufactured by the respective companies was distinctly non-competitive, hence the opportunity for combining in a single bid prices on the product manufactured by the individual companies.

The American Ship Windlass Company was founded about 53 years ago. Aside from being the oldest builder of ship windlasses, capstans, etc., this company was in reality the pioneer in the field and for many years the only patentee of ship windlass machinery. The world wide recognition of the quality of this machinery has been shown by award after award of medals dating back as far as 1876. This company brought out and was the original owner of the first successful automatic towing machine which has since been almost universally adopted by the largest towing companies of the country as well as by the government.

Williamson Brothers Company was founded about 45 years ago. In connection with the development of steering engines it holds a commanding position. In addition to the manufacture of steering engines this company has made a specialty of hoisting machinery of all kinds. This includes not only ship auxiliary machinery such as deck winches, coal handling machinery, etc., but also contractors' hoists and other machines of similar nature.

The Taylor stoker, invented by the late E. E. Taylor, and now exclusively controlled by the American Engineering

GEO. J. HAGAN
FURNACE ENGINEER and CONTRACTOR
Furnaces for Iron and Steel Works,
Water-seal Continuous Gas Producer,
Sole Licensee-Bailey Combination Sheet & Pair Furnaces
Peoples Bank Bldg.
Pittsburg, Pa.

HYDRAULIC AND SANITARY
CHESTER & FLEMING
ENGINEERS
UNION BANK BLDG., PITTSBURGH
PUMPING PLANTS
POWER PLANT ECONOMY
WATER SOFTENING AND CLARIFICATION
SEWAGE DISPOSAL FOR MILLS AND FACTORIES
POWER PLANTS

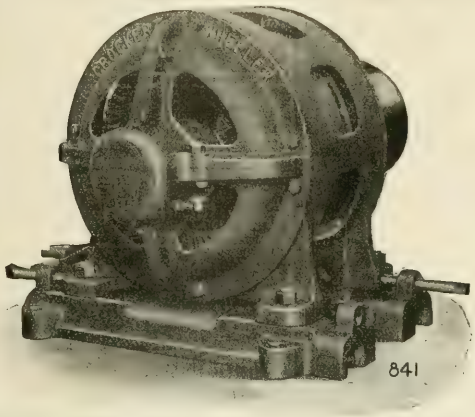
WM. SWINDELL & BROTHERS
ENGINEERS AND CONTRACTORS
Open Hearth and Crucible Steel Melting Furnaces.
Heating and Annealing Furnaces.
Gas Producers, Furnace Reversing Valves 21" to 36".
Gray Iron Castings up to 10,000 Pounds.
Jenkins Arcade Building - PITTSBURGH, PA.

SAMUEL E. DUFF,
CONSULTING DESIGNING
ENGINEER
EXAMINATIONS REPORTS
EMPIRE BUILDING, - - - PITTSBURGH, PA.

JULIAN KENNEDY,
ENGINEER
PITTSBURGH, Pa., U. S. A.
Cable Address.
"ENGINEER, PITTSBURGH"

SCHLIEPER-DAAE COMPANY, Engineers
714 Ferguson Bldg. (Bell Phone 3808 Court) PITTSBURGH, PA.
Blast Furnaces, Bessemer and Open Hearth Steel Works, Rail Mills, Continuous Mills, Merchant Mills, Sheet Mills, Tin Mills, Galvanizing Plants, Pipe Mills, Power Plants, Labor-Saving Devices Relating to Rolling Mills, Steam and Hydraulic Machinery.

G. W. McCLURE, SON & CO.
Sole Representatives, THE McCLURE (Massicks & Crooke) Patent
Three Pass Fire Brick Hot Blast Stoves. Also Two Pass Stoves
Center Combustion Chamber—
Engineers BLAST FURNACE CONSTRUCTION Contractors
Open-Hearth Furnaces, Heating Furnaces, Soaking Pits—All Kinds of Brick Work.
BESSEMER BUILDING (Cable Address Mcclure, Pittsburgh.) PITTSBURGH, PA



CROCKER-WHEELER
25 CYCLE
INDUCTION MOTORS
are built to stand the
heavy strains of steel mill service.
In them
Large air gaps
are *combined* with
High power factor
and High efficiency.
We can tell you how.

CROCKER-WHEELER CO.

Ampere, N. J., Birmingham, Boston, Chicago,
Cleveland, Denver, Detroit, Newark, New Haven,
New York, Philadelphia, Pittsburg, San Francisco,
Syracuse.

Company, was originally built in the plant at Providence, but as the time went on both the marine and the stoker business at this plant grew so rapidly that it became necessary to transfer the marine business to Philadelphia in order to give more room for both branches of the work. But hardly had this division been made when the stoker business itself began to outgrow the Providence plant. As it was impracticable to increase the capacity of this plant without entirely rebuilding the decision was soon made to build additional shops at Philadelphia and consolidate all the various departments of the business under one head at that point. This has now been done, and beginning January 1, 1912, the name of the parent company operating all of the various businesses will be "American Engineering Company."

At present the Philadelphia plant consists of a foundry approximating 100,000 pounds capacity per day, with the facilities for handling a large amount of jobbing work; machine shops covering approximately 80 feet by 500 feet; pattern shops, storage building for both patterns and finished products, blacksmith shop attached, electrically driven motor plant, centralized office building and engineering department. Thus combined this plant forms one of the largest in the city of Philadelphia.

MODERN USES OF THE ELECTRIC MOTOR IN CONCRETE CONSTRUCTION PLANTS.

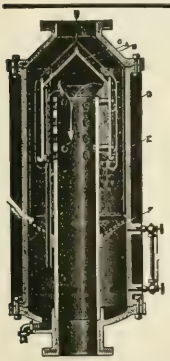
KINDS and amount of power to be used by any concrete construction plant depends upon the various conditions of the job and the ultimate selection of the drives should be made only after a careful consideration of all the elements entering into the cost. Individual jobs are sometimes more alike than would be first supposed and for this reason the remarks made by Morton C. Tuttle, of the Aberthaw Construction Company, Boston, are of interest.

The Aberthaw Construction Company have used steam, electricity and gasolene, but discarded the gas engine a few years ago, primarily because of the independability of the engines used and also because it was difficult to secure in every case a firm base for the engine. The steam engine equipment they have found has distinct advantages at times, such as cold weather concreting, when it is necessary to heat the materials and often thaw around a job.

However, this company prefers electricity where it can be obtained, for the following reasons:

1—The power required on a construction job being intermittent, the saving made when the motor is not in use is considerable.

2—The power is always available on a



Sweet's Steam Separators Surely Separate.

Deliver Steam 99 8-10 Dry. Remove 99 per cent of the Oil.

Sweet Separators are Receiver Separators with ample room for separation, steam storage and lots of water. They purify and dry the steam then store it above and independent of the water chamber. Water chamber is at the bottom and large. Thousands in use—many of them sold on repeat orders.

Sweet Separators keep Heating Systems, Boilers, Condensers,etc., free from oil and the expensive results that follow from the use of oil-laden steam. They deliver exhaust steam pure and ready for use in Laundries, Dye Houses, Ice plants, etc. Made in all styles and sizes from 50 to 24,000 lbs. in weight. Get the Catalog.

DIRECT SEPARATOR COMPANY,
702 GEDDES STREET, SYRACUSE, NEW YORK.
JAMES BONAR & CO., Sales Agents, - - - 516 Frick Building, Pittsburgh, Pa.

[illegible] equipment enough to drive with the different types of current used in different cities as most power companies rent motors on a reasonable basis.

As to the motors used the Aberthaw Construction Company's custom is to arrange their standard 4-bag mixer and belted hoist in one group and drive by a 25-horsepower motor. The saw mill, containing a split saw, planer, a pendulum cut-off saw, boring machine, and grinder are regularly driven by a 10-horsepower motor. For material elevators they have used a 15-horsepower motor running continuously with a belt shift which is operated by a rope. Where the sand bins have been loaded from a track boot a 5-horsepower motor is generally used to run the conveyor equipment. To operate a concrete hoist a 15-horsepower motor is commonly installed if there is one bight in the line. Direct-connected hoists are operated by 22 horsepower units. On the hoist which operates the dump bucket the Aberthaw Construction Company have an additional drum which operates the boom placed on the corner of the concrete tower. For driving their standard mixer, which is a 4-bag machine, 12 horsepower motors are usually set up, but these mixers have been driven with as little as 7½ horsepower each.

International Bridge for Grand Trunk.

Tentative plans are said to have been prepared by the Grand Trunk preparatory to rebuilding the International bridge connecting Buffalo with Victoria, Ont., and providing an additional track in addition possibly to a highway for pedestrians and teams that the present structure does not have and for which there has been an insistent demand for many years. The structure is owned by a separate corporation, but it is a Grand Trunk subsidiary. If the plans are carried out it is estimated the cost of the improvement wil be about $1,000,000.

There has been a great increase in the weight of cars and engines since the bridge now in use was built and the need of a stronger one with increased capacity has reached a point where it is recognized that something must be done to [illegible] advantage.

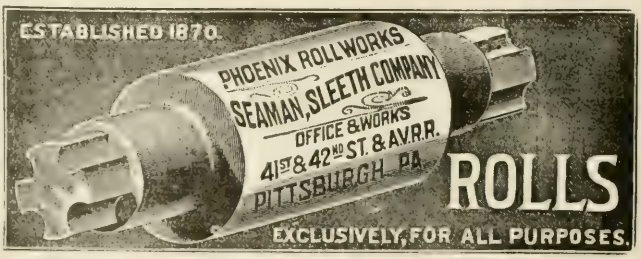
Overland Company claims record for single export shipment of autos, with 90 machines sent abroad last week.

FACTORS INFLUENCING THE SIZE OF COAL POCKETS.

PERHAPS the most important matter which confronts the builder of a coal pocket is the size or capacity from which to derive the best results. In a recent discussion of this question Archibald G. Monks, of Monks & Johnson, Boston, architects and engineers for coal handling plants, stated that in his judgment it was a very great mistake to construct pockets for the storage of slow moving coals. They should be used more as a temporary means for holding the coal in an elevated position, so that it may be screened and placed in wagons by gravity. The more frequently the coal is drawn through the pocket, the greater is the return from the investment. For example, a few simple figures will clearly illustrate this point. Assume the cost of a pocket to be $5.00 per ton of capacity—suppose it is filled and emptied once during the year. The fixed charge of interest and depreciation, figured on a basis of 10 per cent, will amount to 50 cents per ton. On the other hand, if the pocket is filled and emptied ten times in the year, the interest and depreciation will amount to only five cents per ton.

It is, therefore, highly essential to adopt as small and as inexpensive a structure as is suitable and practical under the circumstances. In other words, the financial success of the pocket will be dependent on the amount of saving of labor as compared with the fixed charges on the plant. There are many

GALVANIZED SHEETS
CORRUGATED ROOFING, GALVANIZED OR PAINTED,
BLACK STEEL SHEETS.
McCULLOUGH IRON CO.,
MANUFACTURERS. WILMINGTON, DEL.



McKEEFREY & COMPANY
CONNELLSVILLE FOUNDRY
AND FURNACE COKE, FOUNDRY, FORGE
AND BESSEMER PIG IRON
LEETONIA, - - - OHIO.

CENTRAL TUBE COMPANY
LEWIS BUILDING, Manufacturers of PITTSBURGH, PA.
WROUGHT PIPE
Eastern Representatives, Olin, Giberson & Hilands, No. 2 Rector St., New York.
Also Sales Offices in Chicago, St. Louis, and San Francisco.

QUALITY—QUANTITY

25,000

"Kewanee" Unions In Use By One Concern

¶ Quality and Quantity may be said to run in parallel lines. When **Quality** is established, **Quantity** inevitably follows.

¶ Therefore, no essentially necessary device fails to be sold in **quantities** when the **quality** is confirmed by satisfied users.

¶ A mechanically satisfactory union is an urgent need, but until the practical application of the "Kewanee" Principle, there was no union on the market which fully met the requirements.

¶ No all iron gasket union is mechanically satisfactory.

¶ An all brass union is too expensive for many kinds of work, and is often otherwise unsuitable.

¶ With the advent of the **"Kewanee" Union** however, a new combination entered the mechanical field.

¶ Mechanical men who at first tried the new union with some degree of doubt, soon became enthusiastic advertisers of **"Kewanee" Union** merits.

¶ The "Kewanee" Union has been on the market only about ten years, yet to-day **millions** are in use and giving satisfaction.

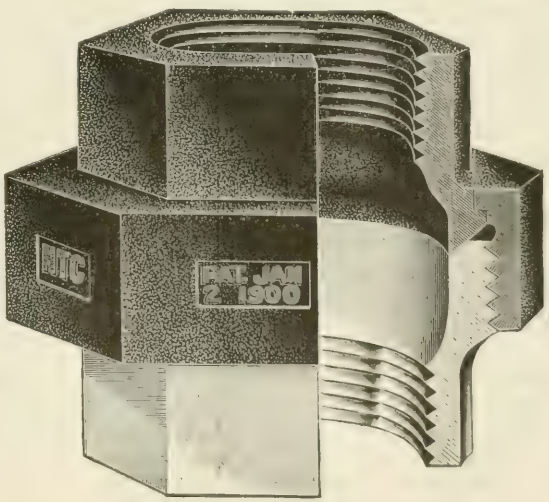
¶ Recently a General Foreman of a large Eastern concern said to one of our representatives who was calling there:

> **"We have over twenty-five thousand "Kewanee" Unions in use to-day in our four plants, and if you want any testimonials, just let me know."**

¶ Twenty-five thousand **"Kewanee" Unions** in actual use by one concern!

Is this a good enough testimonial of QUALITY and QUANTITY?

Our new booklet, "The Whole Kewanee Family," tells all about "Kewanee" Unions." A post-card brings it.



"The Union With No Inserted Parts."

National Tube Company

General Sales Offices: Frick Bldg., PITTSBURGH, PA.

DISTRICT SALES OFFICES:

ATLANTA	NEW ORLEANS	PITTSBURGH
CHICAGO	NEW YORK	ST. LOUIS
DENVER	PHILADELPHIA	SALT LAKE CITY

PACIFIC COAST REPRESENTATIVES—U. S. STEEL PRODUCTS CO.:
SAN FRANCISCO-SEATTLE
PORTLAND-LOS ANGELES

EXPORT REPRESENTATIVES—U. S. STEEL PRODUCTS CO., NEW YORK CITY

The wonderful advantages of the Westinghouse Leblanc Condensers are becoming so generally recognized that no steam power plant can afford to be without them.

This is what a user says:

"We have had in operation continuously for 14 months, one 500 h. p. condenser, 24 hours per day. I wish to say that during that time the condenser has cost us $4.50 for lubrication. Not one penny has been spent for repairs in any way, shape, form or fashion. There is nothing to get out of order; not a single valve to renew (which is very expensive in the old-type condenser). I have had quite a deal of experience with condensers, and I can honestly say the Leblanc condenser is by far the most efficient and economical condenser on the market to-day. I base my decision on the high vacuum the condenser will carry throughout the year. We carry 29 inches all the time; not by gauge, but by mercury column, which must be correct."

The Westinghouse Machine Company

New York, 165 Broadway
Boston, 131 State St.
Cleveland, New England Bldg.
Chicago, 171 La Salle St.
Cincinnati, Traction Bldg.
Atlanta, Candler Bldg.
St. Louis, Chemical Bldg.
Philadelphia, North Am. Bldg.
Pittsburgh, Westinghouse Bldg.
Denver, McPhee Bldg.
San Francisco, Hunt, Mirk & Co.

interesting considerations that enter into this question of storage capacity. It may readily be seen that the problems which present themselves in the design of an inland yard, where coal may be received frequently by rail throughout the year, are far different from those to be met at a plant situated on tide water. And again they are very much unlike those to be found where the supply is very intermittent, such as at a plant located on a river which freezes during the winter months.

Considering the three plants in question as having a similar tonnage, it would appear that the "all-rail" pocket should be the smallest in size. It is apparent from this that the greatest savings could be effected in the "all-rail" pocket since the coal could be handled at the most rapid rate. The spring advance in the price of anthracite coal is, of course, a mater of great importance and should not be lost sight of. In some cases, where coal is handled slowly, it would seem advisable to place at least part of it on the ground, and re-handle it by labor or machinery.

STEEL EXPORTS TO GERMANY.

Kaiser's Retaliatory Duties Affects Crucible Steel's Position.

According to a Berlin cable to the New York "Times" the new German tariffs on Swedish crucible steels puts American makers of that product at a disadvantage. The "Times'" Berlin correspondent says:

"New German commercial treaties with Sweden and Japan were to go into effect on December 1. The treaty with Sweden granted a special tariff on two articles which enter into direct active competition with American imports, namely, crucible tool steel and rubbers.

"In both these lines America had begun to develop a brisk and growing trade in the Fatherland.

"At the beginning of December Hamburg and Bremen agents representing American houses suddenly discovered that their Swedish competitors were getting tool steel and rubbers through the customs at considerably lower rates than those on American goods.

"The Americans protested, but were informed that Sweden had some sort of preferential treatment on tool steel and rubbers, such as Canadian wood pulp was getting in the United States. The Americans then inquired what had become of the most favored nation rights they were supposed to enjoy. The customs authorities smilingly replied that that was the same question they had propounded when they tried to get German wood pulp duty free into the American market."

THE HEINLE COMPANY.

METAL-ROLLING
ENGINEERS.

Economical Methods for Metal Conformation.
Contract Roll Turning Done at Mills.
Difficult Shapes a Specialty.
CONSULTATION, EXAMINATIONS, REPORTS
CRAFTON STATION,
PITTSBURGH, PA.

PATENTS
United States and Foreign.
Trade Marks Registered.
J. M. NESBIT, Attorney,
718 Park Building, Pittsburgh, Pa.

Standard Bridge Tool Co.
PITTSBURGH, PA.
Punching and Shearing Machines
Thomas Spacing Table

GULICK-HENDERSON CO.
INSPECTING ENGINEERS
CHEMISTS—METALLURGISTS
General Offices and Laboratory, 439 Third Ave., Pittsburgh
Chicago
315 Dearborn St.
New York
30 Church St.

PATENTS
TRADEMARKS and COPYRIGHTS
25 Years Practice.
Specialty "Working on the failure of others"
SIGGERS & SIGGERS, Patent Lawyers
Suite 30 National Union Bldg. Washington, D. C

ALUMINUM
Ingots, Sheets, Wire Rods, Castings, Aluminum Wire and Cables (Bare and Insulated), for Electrical Conductors
ALUMINUM COMPANY OF AMERICA.
Formerly The Pittsburgh Reduction Co
PITTSBURGH PA.

Every Business,
Every Trade,
Every Line in
Every Issue.

When you want to—

write an ad.
get up a circular,
lay out a display ad.
send out form letters,
build up a mailing list,
know just what or when or how to
advertise and build your business,

You will want—

BRAINS

The only weekly in the world
of, by and for the retail advertiser

FIVE DOLLARS
THE YEAR.

HOW TO GET A COPY OF BRAINS:

BRAINS Corporation Dept. CA
Scranton, Pa.
Enclosed find $1.00 for which please send me BRAINS on trial for 10 weeks.

Name .....

Address.....

City.....

AGENTS WANTED—
WRITE FOR GOOD
TERRITORY NOW.

Iron, Steel and Tube Works Equipment

STEEL CASTINGS UP TO 50 TONS | SAND, CHILLED and STEEL ROLLS | CAST STEEL, MACHINE MOLDED GEARS

HIGH-SPEED STEAM-HYDRAULIC FORGING-PRESSES

Brass Castings of all Descriptions ℘ "Vandergrift" Bronze Bearings

UNITED ENGINEERING & FOUNDRY CO.,

2311 Farmers Bank Building, Pittsburgh, Pa.

Largest Roll Makers in the World — Makers of the Largest Rolls

Alphabetical Index of Advertising Patrons of Industrial World

Allegheny County Light Co. xiii
Aluminum Company of America ...xviii

Baird Machinery Co. ix
Bartlett, C. O. & Snow Company.....vi
Bickford Fire Brick Co.....xxviii
BRAINS Corporation xix

Carnegie Steel Company x
Central Tube Co. xvi
Chambersburg Engineering Co. ix
Chester & Fleming.....xiv
Clearfield Fire Brick Company....xxviii
Connellsville Mfg. & Mine Supply..xxx
Crocker Wheeler Company xv
Cutler-Hammer Clutch Company vii

Dust Separator Company xv
Doolittle-Hill Electric Co. .....
Dover Fire Brick Company.....xxviii
Duff, Samuel E. xiv

Gulick-Henderson Co. xviii

Hall Steam Pump Co. xxx
Hagan, Geo. J. xiv
Heinle Co., The xviii
Heppenstall Forge & Knife Co.....ix
Homestead Valve Mfg. Co. xxx

Industrial Works vi

Jeffrey Manufacturing Company .....
Jessop Steel Co., Inc. xi
Jones & Laughlin Steel Co. xii

Kennedy, Julian xiv
Kier Fire Brick Company.....xxviii
Kratzer, W. N. & Co. xi
Knox Pressed & Welded Steel Co....v

Laughlin, Alex. & Co. vi
Linde Air Products Co., The ii
Link-Belt Co. xxx

Maloney & Son, T. D.....vi
Mesta Machine Co. .....
Meehan Boiler & Construction Co...viii
Morgan Construction Co. xi
Mackintosh, Hemphill & Co. xxix
McClure, G. W., Son & Co. xiv
McCullough Iron Co. xvi
McKeefrey & Co. xvi
McLanahan-Stone Machine Co. ix

National Tube Co. xvii
Nesbit, J. M. xviii
Northern Engineering Works viii

Otis Elevator Company v

Phillips & McLaren Co. xxix
Phillips Mine & Mill Supply Co. xi
Pittsburgh-Buffalo Co. xxx
Penberthy Injector Company .....

Richardson & Co.....xxi
Riehle Brothers viii
Riter-Conley Mfg. Co. ii
Rogers, Brown & Co. ix

Schlieper-Daae Company xiv
Seaman-Sleeth Co.....xvi
Shimer & Company vi
Siggers & Siggers xviii
Soisson Jos., Fire Brick Co.....xviii
Southwark Foundry & Machine Co..xxi
Standard Bridge Tool Co. xviii
Standard Gauge Steel Co. v
Standard Scale & Supply Co. xiii
Stowe-Fuller Co.....xxviii
Smythe, S. R. Co. viii
Swindell, Wm. & Bros. xiv

Trethewey, Samuel & Co. v

United Eng. & Foundry Co. xx
United Fire Brick Co.....xxviii
U. S. Cast Iron Pipe & Fdry Co.....viii

Westinghouse Machine Co. xviii
Wheeling Mold & Foundry Co. ix
West Va. Fire Clay Mfg. Co. xxvii

RATEAU

STEAM TURBINES
A. C. & D. C. GENERATORS
BLOWERS :: PUMPS

Southwark Foundry & Machine Co.
Philadelphia, Pa.

RAILS

40, 56, 60, 70, 75, 80, 85 and 90 lb.

RELAYING RAILS

8, 12, 16, 20, 25, 30, 35, 40 and 45 lb.

NEW STEEL RAILS

These rails are in stock at our Pittsburgh yards, and can be shipped immediately; also second-hand rails in stock cut any length needed for building and contract work.

Frogs and Switches

RICHARDSON & COMPANY, Inc.,
FULTON BUILDING, Cor. DUQUESNE WAY.
PITTSBURGH, PA.
RAIL DEALERS

Classified Index of Advertisers, Arranged for Ready Reference

ACCUMULATORS-HYDRAULIC.
Chambersburg Engineering Company .....Chambersburg, Pa.

AIR COMPRESSORS.
Baird Machinery Co.....Pittsburgh
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Hall Steam Pump Co. .....Pittsburgh
Mesta Machine Co. .....Pittsburgh

AIR HOISTS.
Baird Machinery Co.....Pittsburgh
Northern Eng. Works ...Detroit, Mich.

AIR PRESSURE TANKS.
Meehan Boiler & Con. Co..Lowellville,O.
National Tube Company .....Pittsburgh
Riter-Conley Mfg. Co. .....Pittsburgh

ALUMINUM.
Aluminum Co. of America...Pittsburgh

ANGLE SHEARS.
Standard Bridge Tool Co.....Pittsburgh

ANNEALING BOXES.
Mesta Machine Co. .....Pittsburgh
Knox Pressed & Welded Steel Company .....Pittsburgh

ANNEALING BOXES, FURNACES AND OVENS.
Meehan Boiler & Con. Co .Lowellville,O.
United Eng. & Fdry Co.....Pittsburgh

ANNEALED TOOL AND DIE STEEL.
Wm. Jessop & Sons, Ltd.....New York

ARC LAMP RESISTANCES.
Cutler-Hammer Mfg. Co.....Milwaukee

ASH HANDLING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

AUTOMATIC ENGINES.
Otis Elevator Company .....Pittsburgh

AXLES.
Carnegie Steel Company .....Pittsburgh

BAR STEEL.
Carnegie Steel Company .....Pittsburgh
Oswald, R. W. .....Pittsburgh

BARREL HANDLING MACHINERY
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BATTERY CHARGING RHEOSTATS
Cutler-Hammer Mfg. Co.....Milwaukee

BEAMS.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

BELLS and GONGS (Seamless Steel.)
National Tube Company .....Pittsburgh

BELTING.
Baird Machinery Co.....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Oswald, R. W. .....Pittsburgh

BELT CONVEYORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BENDING MACHINES-HYDRAULIC
Chambersburg Engineering Company .....Chambersburg, Pa.
Standard Bridge Tool Co.....Pittsburgh

BENDING ROLLS.
Standard Bridge Tool Co.....Pittsburgh

BLAST FURNACE BRICK.
Stowe-Fuller Co. .....Cleveland, O.

BLAST FURNACES.
Riter-Conley Mfg. Co. .....Pittsburgh

BLOWER REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

BLOWING ENGINES.
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

BLAST FURNACE BRICK.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa.

BOILERS.
H. J. Koontz .....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

BCILER FITTINGS.
National Tube Company .....Pittsburgh

BOILER TUBES.
National Tube Company .....Pittsburgh

BOILER SETTINGS.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa.

BREEZE COKE.
T. D. Maloney & Son .....Pittsburgh

BORING MACHINES.
Baird Machinery Co.....Pittsburgh

BRAKES (Electric.)
Cutler-Hammer Mfg. Co.....Milwaukee

BRAKE SOLENOIDS.
Cutler-Hammer Mfg. Co.....Milwaukee

BRASS AND BRONZE CASTINGS.
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

BRAZING.
Linde Air Products Co., The.....
.....Buffalo, N. Y.

BRIDGE AND STRUCTURAL WORK
Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

BRIDGE BUILDERS.
Riter-Conley Mfg. Co. .....Pittsburgh

BUCKETS.
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.

BUCKETS (Coal.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUCKETS (Ore.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUCKETS (Self Filling.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUILDING BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

CAR FORGINGS.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Phillips Mine & Mill Supply Company .....Pittsburgh

CAR HAULS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CARRIERS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CARS (Industrial).
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CASTINGS.
Chambersburg Engineering Company .....Chamber-burg, Pa.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Mackintosh, Hemphill & Co...Pittsburgh
McLanahan Stone Machine Company .....Hollidaysburg, Pa.
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh
Wheeling Mould & Fdry. Co...Wheeling
Wm. Swindell & Bros. .....Pittsburgh

CASTINGS (Malleable.)
Jeffrey Manufacturing Co..Columbus, O.

CEMENT HANDLING MACHINERY
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CENTRAL CONDENSERS.
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

CHAIN BELTING.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
McLanahan Stone Machine Company .....Hollidaysburg, Pa.

CHAIN DRIVES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAIN HOISTS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh
Link-Belt Company .....Philadelphia

CHAINS (Dodge, Ewart, Ley, Monobar, Maximum, etc.)
Link-Belt Company .....Philadelphia

CHAIN SLINGS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAIN GRATES.
American Stoker Co. .....New York

CHANNELS.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

CHEMISTS.
Gulick-Henderson Co. .....Pittsburgh

CHROME BRICK.
Stowe-Fuller Co. .....Cleveland, O.

CIRCUIT BREAKERS.
Stowe-Fuller Co. .....Cleveland, O.

CLAPPER TYPE SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

CLAY MACHINERY.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Philips & McLaren Co. .....Pittsburgh

CLUTCH (Magnetic.)
Cutler-Hammer Mfg. Co.....Milwaukee

COAL.
Pittsburgh-Buffalo Co. .....Pittsburgh

COAL AND ASH HANDLING MACHINERY.
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CUTTING.
(Sprues and Risers off Castings.)
Linde Air Products Co., The.....
.....Buffalo, N. Y.

COAL CUTTERS.
Jeffrey Manufacturing Co..Columbus, O.

COAL DEALERS' SUPPLIES.
Standard Scale & Supply Co...Pittsburgh

COAL HAULING TIPPLES, MINING, WASHING & CRUSHING PLANTS.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

COAL AND ORE BRIDGE CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

COCKS.
National Tube Company .....Pittsburgh

COCKS (Iron Body and "High-Duty-Metal.")
National Tube Company .....Pittsburgh

COKE.
Bessemer Coke Co.....Pittsburgh
McKeefrey & Co. .....Leetonia, O.
Pittsburgh-Buffalo Co. .....Pittsburgh
Rogers, Brown & Co.....Cincinnati, O.
Semet-Solvay Company, The.....Pittsburgh

COKE CHARGING CARS.
Jeffrey Manufacturing Co..Columbus, O.

COLD DRAWN STEEL SHAFTING AND SHAPES.
Jones & Laughlin Steel Co....Pittsburgh
Standard Gauge Steel Company .....Beaver Falls, Pa.

COLUMNS.
Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
W. N. Kratzer & Co. .....Pittsburgh

CONCRETE MIXERS.
P. Pettler & Son .....Beaver Falls, Pa.
Standard Scale & Supply Co...Pittsburgh

CONCRETE REINFORCEMENT.
The Consolidated Expanded Metal Co.'s .....Pittsburgh

CONDENSERS.
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

CONNECTING RODS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

CONSULTING ENGINEERS.
Doubleday-Hill Electric Co..Pittsburgh.
Duff, Samuel E. .....Pittsburgh
Kennedy, Julian .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh
Standard Bridge Tool Co.....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

CONTRACTORS.
Geo. J. Hagan .....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

CONTROLLERS (Electric.)
Cutler-Hammer Mfg. Co.....Milwaukee
Otis Elevator Company .....Pittsburgh
Doubleday-Hill Electric Co..Pittsburgh.

CONVEYORS AND ELEVATORS.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Belt.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Flight.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Screw.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYING MACHINERY.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CORRUGATED IRON.
McCollough Iron Co..Wilmington, Del.

COUPLINGS.
National Tube Company .....Pittsburgh

COUPLINGS (Magnetic.)
Cutler-Hammer Mfg. Co.....Milwaukee

COUPLINGS (Wrought.)
National Tube Company .....Pittsburgh
Central Tube Co. .....Pittsburgh

CRANES.
Northern Eng. Works ...Detroit, Mich.

CRANE CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

CRANES—LOCOMOTIVE.
Brown Hoisting Mach. Co...Cleveland
H. J. Koontz .....Pittsburgh
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CRANES & HOISTING MACHINERY
Baird Machinery Co.....Pittsburgh
H. J. Koontz .....Pittsburgh
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Northern Eng. Works ...Detroit, Mich.

CRANK SHAFTS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

CRANE UNLOADERS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CRUCIBLE STEEL.
Wm. Jessop & Sons, Ltd.....New York

CRUCIBLE STEEL MELTING FURNACES.
Wm. Swindell & Bros. .....Pittsburgh

CUPOLA.
Northern Eng. Works ...Detroit, Mich.
Riter-Conley Mfg. Co. .....Pittsburgh

CUPOLA BLOCKS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.
United Fire Brick Co...Uniontown, Pa.
West Va. Fire Clay Mfg. Co..Pittsburgh

CUPOLA LININGS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. ....Cleveland, O.

CYLINDERS.
Mesta Machine Company ....Pittsburgh

DIE BLOCKS.
Heppenstall Forge & Knife Company .....Pittsburgh

DIRECT MOTOR DRIVES.
Crocker-Wheeler Co.....Ampere, N. J.

DISC BRAKES.
Cutler-Hammer Mfg. Co.....Milwaukee

DITCHERS.
Jeffrey Manufacturing Co..Columbus, O.

DREDGE CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DREDGES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DREDGING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.

DRILLS.
Jeffrey Manufacturing Co..Columbus, O.

DRILLS FOR COAL MINES.
Jeffrey Manufacturing Co..Columbus, O.

DRIVE CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DRIVE WELL POINTS AND WELL SUPPLIES.
National Tube Company .....Pittsburgh

DOVETAIL ROLLS.
The Heinle Company .....Pittsburgh

DROP HAMMERS.
Chambersburg Engineering Company .....Chambersburg, Pa.

DYNAMO BRUSHES.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

DYNAMOS AND MOTORS.
Crocker-Wheeler Co.....Ampere, N. J.
H. J. Koontz .....Pittsburgh
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC HOISTS.
Northern Eng. Works ...Detroit, Mich.
Otis Elevator Company .....Pittsburgh

ELECTRIC LIGHTING MACHIN'RY
Crocker-Wheeler Co.....Ampere, N. J.
Southwark Foundry & Machine Company .....Philadelphia

ELECTRICAL REPAIRS.
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC LAMPS (Arc and Incandescent)
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC LOCOMOTIVES.
Jeffrey Manufacturing Co..Columbus, O.
Northern Eng. Works ...Detroit, Mich.

ELECTRICAL SUPPLIES.
Doubleday-Hill Electric Company .... Pittsburgh, Pa.

ELEVATOR CONTROLLERS AND ACCESSORIES.
Cutler-Hammer Mfg. Co.....Milwaukee

ELEVATORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Northern Eng. Works ...Detroit, Mich.
Otis Elevator Company .....Pittsburgh

EMERY & CORUNDUM WHEELS.
Standard Scale & Supply Co...Pittsburgh

ENGINEERS.
Chambersburg Engineering Company .....Chambersburg, Pa.
Chester & Fleming .....Pittsburgh, Pa.
Duff, Samuel E. .....Pittsburgh
G. W. McClure Son & Co....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Kennedy, Julian .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh
Link-Belt Company .....Philadelphia
Morgan Construction Company..... .....Worcester, Mass.
The S. R. Smythe Co. .....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

ENGINEERS—INSPECTING.
Gulick-Henderson Co. .....Pittsburgh

ENGINEERS—LABORATORY.
Gulick-Henderson Co. .....Pittsburgh

ENGINEERS (Mechanical.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

ENGINES.
Oswald, R. W. .....Pittsburgh
Otis Elevator Company .....Pittsburgh

ENGINES (Steam.)
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
H. J. Koontz .....Pittsburgh
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

EQUALIZING GEARS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

EXPANDED METAL.
The Consolidated Expanded Metal Co.'s .....Pittsburgh

EXPANSION METAL.
National Tube Company .....Pittsburgh

FAN REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

FEED WATER HEATERS, FILTERS AND PURIFIERS.
H. J. Koontz .....Pittsburgh

FIELD REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

FIRE ARCH BRICK.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa
Stowe-Fuller Co. .....Cleveland, O

FIRE BRICK AND CLAY.
Bickford Fire Brick Company..... .....Curwensville, Pa.
Clearfield Fire Brick Co...Clearfield, Pa.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Pittsburgh-Buffalo Co. .....Pittsburgh
Jos. Soisson Brick Co..Connellsville, Pa.
Sandy Ridge Fire Brick Company .....Sandy Ridge, Pa.
Stowe-Fuller Co. .....Cleveland, O.
United Fire Brick Co...Uniontown, Pa.
West Va. Fire Clay Mfg. Co..Pittsburgh

FIRE ESCAPES.
W. N. Kratzer & Co. .....Pittsburgh

FIRE PROOFING.
W. N. Kratzer & Co. .....Pittsburgh

FIRE PUMP STARTERS.
Cutler-Hammer Mfg. Co.....Milwaukee

FITTINGS.
National Tube Company .....Pittsburgh

FITTINGS (Malleable and Cast Iron.)
National Tube Company .....Pittsburgh

FLAG STAFFS.
National Tube Company .....Pittsburgh

FLANGES (Cast and Malleable.)
National Tube Company .....Pittsburgh

FLATS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

FLANGING CLAMPS.
Chambersburg Engineering Company .....Chambersburg, Pa.
Standard Bridge Tool Co.....Pittsburgh

FLANGING.
Knox Pressed & Welded Steel Company .....Pittsburgh

FINISHED MACHINE KEYS.
Standard Gauge Steel Company .....Beaver Falls, Pa

FLIGHT CONVEYORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

FLOAT SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

FORGE AND FURNACE LININGS.
Bickford Fire Brick Company..... .....Curwensville, Pa

FORGINGS.
Carnegie Steel Company .....Pittsburgh
Heppenstall Forge & Knife Company .....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Mesta Machine Company ....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

FORGINGS PRESSES.
Chambersburg Engineering Company .....Chambersburg, Pa.
Mesta Machine Co. .....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

FOUNDRY EQUIPMENTS.
Baird Machinery Co.....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

FOUNDRY FIRE BRICK.
Bickford Fire Brick Company..... .....Curwensville, Pa.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Stowe-Fuller Co. .....Cleveland, O

FRICTION CLUTCHES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

FURNACES.
American Stoker Co. .....New York

FURNACE BUILDERS.
Laughlin, Alex & Co. .....Pittsburgh
Geo. J. Hagan .....Pittsburgh
G. W. McClure Son & Co....Pittsburgh
Kennedy, Julian .....Pittsburgh
Morgan Construction Company..... .....Worcester, Mass.
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

GALVANIZED SHEETS.
McCollough Iron Co..Wilmington, Del.

GAS AND GASOLINE ENGINES.
Standard Scale & Supply Co...Pittsburgh

GAS ENGINES.
Mesta Machine Company ....Pittsburgh

GAS PRODUCERS.
Geo. J. Hagan .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh.
Morgan Construction Company..... .....Worcester, Mass.
Riter-Conley Mfg. Co. .....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

GATE VALVES.
National Tube Company .....Pittsburgh

GEARING (Bevel, Mitre, Spur, etc.)
Link-Belt Company .....Philadelphia

GEARS.
Jeffrey Manufacturing Co..Columbus, O.
Mesta Machine Company ....Pittsburgh

GENERATORS.
Crocker-Wheeler Co.....Ampere, N. J.
Doubleday-Hill Electric Co..Pittsburgh

GERMAN SILVER
Shuner & Company, Inc. Pittsburgh

GIRDERS.
DeMoines Bridge & Iron Company ..... DeMoines, Ia.

Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
W. N. Kratzer & Co. .....Pittsburgh

GLOBE VALVES.
National Tube Company .....Pittsburgh

GRAB BUCKETS.
Jeffrey Manufacturing Co..Columbus, O

GRATES.
American Stoker Co. .....New York

GRAIN TANKS.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa

GROUND FIRE CLAY.
West Va. Fire Clay Mfg. Co..Pittsburgh

GUILLOTINE SHEARS.
Standard Bridge Tool Co.....Pittsburgh

HEAD FRAMES.
Riter-Conley Mfg. Co. .....Pittsburgh

HIGH SPEED PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

HOISTING ENGINES.
Otis Elevator Company .....Pittsburgh

HORIZONTAL DRILLS.
Baird Machinery Co.....Pittsburgh

HORIZONTAL PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

HOT BLAST STOVE BRICK.
Stowe-Fuller Co. .....Cleveland, O

HOT BLAST STOVES.
Bickford Fire Brick Company..... .....Curwensville, Pa.
G. W. McClure Son & Co....Pittsburgh

HOT METAL CARS.
Meehan Boiler & Con. Co..Lowellville,O.

HYDRAULIC ENGINEERS.
Chester & Fleming .....Pittsburgh, Pa.

HYDRAULIC MACHINERY.
Baird Machinery Co.....Pittsburgh
Chambersburg Engineering Company .....Chambersburg, Pa.
Mesta Machine Company ....Pittsburgh

HYDRAULIC PUMPS.
Chambersburg Engineering Company .....Chambersburg, Pa.

HYDRAULIC VALVES AND FITTINGS.
Chambersburg Engineering Company .....Chambersburg, Pa.
National Tube Company .....Pittsburgh

INJECTORS—AUTOMATIC.
Penberthy Injector Co. ..Detroit, Mich

ICE TOOLS.
Standard Scale & Supply Co...Pittsburgh

IGNITION BATTERY RHEOSTATS.
Cutler-Hammer Mfg. Co.....Milwaukee

INDUSTRIAL RAILWAYS.
Link-Belt Company .....Philadelphia

INSPECTION.
The Heinle Company .....Pittsburgh
Gulick-Henderson Co. .....Pittsburgh

IRON AND STEEL BARS.
Jones & Laughlin Steel Co....Pittsburgh

IRON FENCING.
W. N. Kratzer & Co. .....Pittsburgh

IRON ROOFS AND BUILDINGS.
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

"KEWANEE" UNIONS & SPECIALTIES.
National Tube Company .....Pittsburgh

LADLES.
Knox Pressed & Welded Steel Company .....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

LADLE BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

LADLE LININGS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.

LATHES.
Baird Machinery Co.....Pittsburgh

LIFTING MAGNETS.
Cutler-Hammer Mfg. Co.....Milwaukee

LIMIT SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

LINK-BELTING.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

LOCOMOTIVE CRANES.
Industrial Works .....Bay City, Mich.
Link-Belt Company .....Philadelphia

LOCOMOTIVE FIRE BRICK
Bickford Fire Brick Company..... .....Curwensville, Pa.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.

MACHINE BOLTS.
Riter-Conley Mfg. Co. .....Pittsburgh

MACHINE RACK.
Standard Gauge Steel Company .....Beaver Falls, Pa.

MACHINE TOOLS.
Baird Machinery Co.....Pittsburgh
H. J. Koontz .....Pittsburgh.

MACHINERY CASTINGS.
Wm. Swindell & Bros. .....Pittsburgh

MAGNESIA BRICK.
Stowe-Fuller Co. .....Cleveland, O.

MAGNESITE.
Stowe-Fuller Co. .....Cleveland, O.

MAGNETIC CLUTCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

MAGNETIC SEPARATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

MAGNETIC (Electric Lifting.)
Cutler-Hammer Mfg. Co.....Milwaukee

MALLEABLE CASTINGS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

MASTER SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

MAXIMUM SILENT CHAIN.
Link-Belt Company .....Philadelphia

METAL CONFORMATION.
The Heinle Company .....Pittsburgh

METALLURGISTS.
Gulick-Henderson Co. .....Pittsburgh

MILLING MACHINES.
Baird Machinery Co.....Pittsburgh
Standard Bridge Tool Co.....Pittsburgh

MINE FANS.
Jeffrey Manufacturing Co..Columbus, O.

MINING MACHINERY & SUPPLIES.
C. O. Bartlett & Snow Co.....Cleveland
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Doubleday-Hill Electric Co..Pittsburgh.
Jeffrey Manufacturing Co..Columbus, O.
Meehan Boiler & Con. Co..Lowellville,O.
Phillips Mine & Mill Supply Company .....Pittsburgh

MOTORS.
Crocker-Wheeler Co.....Ampere, N. J.
Doubleday-Hill Electric Co..Pittsburgh.

MONEL METAL.
Shimer & Company, Inc. ...Pittsburgh.

MULTIPLE PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

OIL REFINERY WORK.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

ORE CARS.
Jeffrey Manufacturing Co..Columbus, O.

ORE CONCENTRATORS & SEPARATORS.
McLanahan Stone Machine Company .....Hollidaysburg, Pa.

ORE HANDLING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

OXYGEN.
The Linde Air Products Co....Buffalo

OXY-ACETYLENE WELDING AND CUTTING APPARATUS.
The Linde Air Products Co....Buffalo

PATENTS.
J. M. Nesbit .....Pittsburgh
Siggers & Siggers..Washington, D. C.

PAVING BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

PAVING BLOCK.
West Va. Fire Clay Mfg. Co..Pittsburgh

"PECK" CARRIERS.
Link-Belt Company .....Philadelphia

PENSTOCKS.
Riter-Conley Mfg. Co. .....Pittsburgh
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.
Knox Pressed & Welded Steel Company .....Pittsburgh

PHOSPHOR BRONZE.
Shimer & Company, Inc.....Pittsburgh

PIG METALS (ORES, etc.)
McKeefrey & Co. .....Leetonia, O.
Rogers, Brown & Co.....Cincinnati, O.

PIG IRON.
Shimer & Company, Inc.....Pittsburgh

PILE DRIVERS.
Industrial Works .....Bay City, Mich.

PILLAR CRANES.
Industrial Works .....Bay City, Mich.
Northern Eng. Works ...Detroit, Mich.

PIPE AND PIPE FITTINGS.
Central Tube Co. .....Pittsburgh
National Tube Company .....Pittsburgh
U. S. Cast Iron & Pipe Foundry Company .....Scottdale, Pa.

PIPE COILS.
National Tube Company .....Pittsburgh

PIPES (Riveted Steel).
Riter-Conley Mfg. Co. .....Pittsburgh

PLATE WORK.
Knox Pressed & Welded Steel Company .....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
Riter-Conley Mfg. Co. .....Pittsburgh
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

POLES (Tubing Steel.)
National Tube Company .....Pittsburgh

POWER PLANTS.
Doubleday-Hill Electric Co..Pittsburgh.
Mesta Machine Company ....Pittsburgh

PNEUMATIC TOOLS.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
H. J. Koontz .....Pittsburgh.

PRESSES—DRILL AND DROP.
Baird Machinery Co.....Pittsburgh

PRESSURE REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

PULLEYS AND CLUTCHES.
Baird Machinery Co.....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh
Link-Belt Company .....Philadelphia
Mesta Machine Company ....Pittsburgh

PUMP CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

PUMPS.
Hall Steam Pump Co. .....Pittsburgh
Mesta Machine Company ....Pittsburgh

PUNCHES.
Standard Bridge Tool Co.....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

QUARRY MACHINERY.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Phillips Mine & Mill Supply Company .....Pittsburgh

RADIAL DRILLS.
Standard Bridge Tool Co.....Pittsburgh

RADIATORS.
National Tube Company .....Pittsburgh

RADIATORS (Staggered Tube-Wrought).
National Tube Company .....Pittsburgh

RECIPROCATING CONVEYORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

RELAYING RAILS.
Richardson Company .....Pittsburgh

REMOTE CONTROL APPARATUS.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

REPAIRING CASTINGS.
Linde Air Products Co., The..... .....Buffalo, N. Y.

REPAIRING LOCOMOTIVES.
Linde Air Products Co., The..... .....Buffalo, N. Y.

RESISTANCE GRIDS.
Cutler-Hammer Mfg. Co.....Milwaukee

RESISTANCE UNITS.
Cutler-Hammer Mfg. Co.....Milwaukee

REVERSE CLUTCHES.
Bessemer Gas Engine Company .....Greve City, Pa.

REVERSING ENGINES.
Mesta Machine Company ....Pittsburgh
Otis Elevator Company .....Pittsburgh

REVERSING FURNACE VALVES.
Wm. Swindell & Bros. .....Pittsburgh

RIVETED PIPE.
Meehan Boiler & Con. Co..Lowellville,O.
Knox Pressed & Welded Steel Company .....Pittsburgh

RIVETED WATER PIPE.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

RIVETERS.
Baird Machinery Co.....Pittsburgh
Chambersburg Engineering Company .....Chambersburg, Pa.
Standard Bridge Tool Co.....Pittsburgh

RIVETTING.
Linde Air Products Co., The..... .....Buffalo, N. Y.

ROLL ALTERNATORS.
The Heinle Company .....Pittsburgh

ROLL DESIGNERS.
The Heinle Company .....Pittsburgh
Mesta Machine Co. .....Pittsburgh
Seaman Sleeth Co.....Pittsburgh, Pa.
United Eng. & Fdry Co.....Pittsburgh

ROLL LATHES.
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

ROLLING MILL MACHINERY.
Crocker-Wheeler Co.....Ampere, N. J.
Heppenstall Forge & Knife Company .....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
Morgan Construction Company..... .....Worcester, Mass.
Philips & McLaren Co. .....Pittsburgh
Seaman Sleeth Co.....Pittsburgh, Pa.
United Eng. & Fdry Co.....Pittsburgh
Wheeling Mould & Fdry. Co...Wheeling

ROLL TURNERS.
The Heinle Company .....Pittsburgh

ROLL TURNING TOOLS.
Heppenstall Forge & Knife Company .....Pittsburgh
Samuel Trethewey & Co. ....Pittsburgh
Seaman Sleeth Co.....Pittsburgh, Pa.

ROOF TRUSSES.
W. N. Kratzer & Co. .....Pittsburgh

ROPE COATING.
C. O. Bartlett & Snow Co.....Cleveland

ROPE TRANSMISSION.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh
Link-Belt Company .....Philadelphia
Mesta Machine Company ....Pittsburgh

SAND.
Standard Sand & Crushed Co., Inc. ....Pittsburgh

SAND HANDLING MACHINERY.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

SANITARY ENGINEERS.
Chester & Fleming .....Pittsburgh, Pa.

SCALES.
Fairbanks Co., The .....Pittsburgh
Standard Scale & Supply Co...Pittsburgh

SCRAP METAL.
Koehler & Streng .....Pittsburgh

SCREENS.
C. O. Bartlett & Snow Co.....Cleveland
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.

SCREW STOCK.
Standard Gauge Steel Company .....Beaver Falls, Pa.

SECOND HAND MACHINERY.
Baird Machinery Co.....Pittsburgh
H. J. Koontz .....Pittsburgh.

SEWER PIPE AND FLUE LININGS
West Va. Fire Clay Mfg. Co..Pittsburgh

SELF STARTERS.
Cutler-Hammer Mfg. Co.....Milwaukee

SHEARS.
Mesta Machine Company ....Pittsburgh
Philips & McLaren Co. .....Pittsburgh
Wheeling Mould & Fdry. Co...Wheeling

SHEAVE WHEELS.
Link-Belt Company .....Philadelphia

SHEET IRON AND STEEL.
McCullough Iron Co...Wilmington, Del.

SHELBY SEAMLESS STEEL MECHANICAL TUBING.
National Tube Company .....Pittsburgh

SILICA BRICK.
Kier Fire Brick Company ....Pittsburgh
Stowe-Fuller Co. .....Cleveland, O.
United Fire Brick Co...Uniontown, Pa.

SNAP SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

SOLENOIDS.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

SOLENOID SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

SOLID STEEL SHEAR KNIVES.
Samuel Trethewey & Co. ....Pittsburgh
Heppenstall Forge & Knife Company .....Pittsburgh

SPACING TABLES.
Standard Bridge Tool Co.....Pittsburgh

SPECIAL MACHINERY.
Standard Bridge Tool Co.....Pittsburgh

SPECIAL SHAPES.
Standard Gauge Steel Company .....Beaver Falls, Pa.

SPEED REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

SPINDLE DRILLS.
Standard Bridge Tool Co.....Pittsburgh

SPLITTING SHEARS.
Standard Bridge Tool Co.....Pittsburgh

SPRING AND TOOL STEEL.
Wm. Jessop & Sons, Ltd.....New York

SPROCKET CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

STACKS.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

STAND PIPES.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

STARTERS (Electric Motor.)
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

STARTING RHEOSTATS.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

STEAM DROP HAMMERS.
Chambersburg Engineering Company .....Chambersburg, Pa.

STEAM HAMMERS.
Baird Machinery Co.....Pittsburgh
Chambersburg Engineering Company .....Chambersburg, Pa.
Samuel Trethewey & Co. ....Pittsburgh

STEAM PUMPS.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Hall Steam Pump Co. .....Pittsburgh

STEEL BUILDING & STRUCTURAL
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh

STEEL CASTINGS AND FORGINGS
Chambersburg Engineering Company .....Chambersburg, Pa.
Mesta Machine Company ....Pittsburgh
Samuel Trethewey & Co. ....Pittsburgh
Wm. Jessop & Sons, Ltd.....New York

STEEL CASTING PLANTS.
Wm. Swindell & Bros.....Pittsburgh.

STEEL DIES.
Samuel Trethewey & Co.....Pittsburgh.

STEEL MILL CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

STEEL CONSTRUCTION.
Knox Pressed & Welded Steel Company .....Pittsburgh
Riter-Conley Mfg. Co. .....Pittsburgh

STEEL TANKS AND TOWERS.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.
Knox Pressed & Welded Steel Company .....Pittsburgh

STEEL CROSS TIES.
Carnegie Steel Company .....Pittsburgh

STEEL MINE TIES.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh

STEEL OIL DERRICKS.
Carnegie Steel Company .....Pittsburgh

STEEL SHEET PILING.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh

STEEL WHEELS.
Carnegie Steel Company ....Pittsburgh

STRAIGHTING MACHINES.
Standard Bridge Tool Co.....Pittsburgh

STRUCTURAL IRON WORKS.
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

STOKERS.
American Stoker Co. .....New York

SWITCHES (Electric).
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

SQUARES.
Standard Gauge Steel Company .....Beaver Falls, Pa.

TANKS.
Jeffrey Manufacturing Co..Columbus, O.
Meehan Boiler & Con. Co..Lowellville,O.
Riter-Conley Mfg. Co. .....Pittsburgh
Knox Pressed & Welded Steel Company .....Pittsburgh
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.

TELPHERAGE.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

TESTING MACHINES.
Riehle Brothers .....Philadelphia

TILE (Fire Clay, Etc.)
Bickford Fire Brick Company.....Curwensville, Pa.
Kier Fire Brick Company ....Pittsburgh
Stowe-Fuller Co. .....Cleveland, O.

TILE (Locomotive).
Bickford Fire Brick Company.....Curwensville, Pa.
Stowe-Fuller Co. .....Cleveland, O.

TIN PLATE MACHINERY.
Industrial Works .....Bay City, Mich.
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh
Northern Eng. Works....Detroit, Mich.

TRANSFORMERS.
Crocker-Wheeler Co.....Ampere, N. J.

TRANSFER CRANES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
McLanahan Stone Machine Company .....Hollidaysburg, Pa.
Phillips Mine & Mill Supply Company .....Pittsburgh

TRANSMITTING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Mesta Machine Company....Pittsburgh.

TOOL STEEL.
Wm. Jessop & Sons, Ltd.....New York

TREADLE OPERATED CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

TROLLEY POLES.
National Tube Company .....Pittsburgh

TRUCKS.
Phillips Mine & Mill Supply Company .....Pittsburgh

TUBES.
National Tube Company .....Pittsburgh

TUYERE COCKS.
National Tube Company .....Pittsburgh

UNIONS ("Kewanee" and Flange).
National Tube Company .....Pittsburgh

VALVES.
Homestead Valve Mfg. Co...Pittsburgh
Morgan Construction Company.....Worcester, Mass.
National Tube Company .....Pittsburgh

VANADIUM STEEL.
Carnegie Steel Company ....Pittsburgh

VENTILATING FANS.
Doubleday-Hill Electric Co..Pittsburgh.
Jeffrey Manufacturing Co..Columbus, O.

VERTICAL DEEP WELL PUMPS.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.

WATER AND GAS PIPES.
Central Tube Co. .....Pittsburgh
National Tube Company .....Pittsburgh
U. S. Cast Iron & Pipe Foundry Company .....Scottdale, Pa.

WATER TUBE BOILERS.
Meehan Boiler & Con. Co..Lowellville,O.

WELL POINTS AND WELL SUPPLIES.
National Tube Company .....Pittsburgh

WELDING.
Knox Pressed & Welded Steel Company .....Pittsburgh

WELDING AND CUTTING APPARATUS.
The Linde Air Products Co....Buffalo

WHEELS.
Phillips Mine & Mill Supply Company .....Pittsburgh

WIRE ROPE.
Doubleday-Hill Electric Co..Pittsburgh.
Jeffrey Manufacturing Co..Columbus, O.

WIRE WORK.
W. N. Kratzer & Co. .....Pittsburgh

WRECKING PURPOSES.
Linde Air Products Co., The.....Buffalo, N. Y.

The Stowe-Fuller Co.
Manufacturers of
Magnesia, Chrome, Silica
and
High Grade Fire Clay Brick.
Extend to its friends and customers the season's greetings and best wishes for a prosperous 1912.
Cleveland, O. Pittsburgh, Pa.

Clearfield Fire Brick Co.
CLEARFIELD FIRE BRICK
OFFICE AND WORKS, CLEARFIELD, PA.

CRESCENT FIRE BRICK
BICKFORD FIRE BRICK COMPANY
office and works
CURWENSVILLE
CLEARFIELD COUNTY, PA.
LONG DISTANCE TELEPHONE

DOVER FIRE BRICK COMPANY,
MANUFACTURERS OF
Highest Grade Pennsylvania and Ohio
FIRE BRICK
"NORTH BEND." "DOVER." "BUCKEYE."
GENERAL OFFICES:
509 CUYAHOGA BLDG.,
CLEVELAND, OHIO.
PITTSBURGH OFFICE:
DIAMOND BANK BLDG.
1838 Court.

Joseph Soisson Fire Brick Company

Established 1845
"SALINA"
"ETNA"
"LYON"
"YOUGH"
Kier Fire Brick Co.
Manufacturers of
High Grade
FIRE CLAY AND
SILICA BRICK
PITTSBURGH, PA.

UNITED FIRE BRICK CO.
HIGH GRADE FIRE CLAY AND SILICA BRICK,
SPECIAL SHAPES AND DUST.
Main office: UNIONTOWN, PA
Branch Office: 1801 ARBOTT BLDG., PITTSBURGH, PA.
Phones: Bell 1957 Court; P. & A. 1696 Main

WHEN
ANSWERING ADVERTISEMENTS
PLEASE MENTION
THE INDUSTRIAL WORLD

PHONE COURT 1838
FIRE BRICK ALL SHAPES
WEST VA. FIRE CLAY MFG. CO.
All Fire Clay Products
Fire Clay
DIAMOND BANK BUILDING
PITTSBURG, PA.

JUST OUT

ANNUAL STATISTICAL REPORT, 1910

OF THE

AMERICAN IRON AND STEEL ASSOCIATION

"Swank's Statistics" are the Final Appeal of the Trade

The annual statistical report of the American Iron and Steel Association for 1910, by Editor James M. Swank, is ready for distribution. The statistics of the production of iron and steel in the United States for that year and preceding years are complete. Tables are given which show in detail imports and exports of iron and steel, tinplates, iron ore, coal, etc. Full details are given of the shipments of iron ore from the Lake Superior and other mines, the imports of Cuban and other iron ore, the prices of Lake Superior iron ore, the shipments and prices of Connellsville coke, the imports and exports of coal and coke, the tonnage of steel vessels built in 1909 and 1910, immigration in 1910, etc.

The price tables, which have been made more comprehensible than ever, will especially commend themselves to all who are connected with the iron trade. The usual tables showing the production of pig iron by grades are given in full. The tables relating to our production of steel give the annual growth in recent years of all kinds of steel, including the growing use of alloys and the use of electricity in the manufacture of steel.

The statistics of rail production in 1910 are given in usual detail. They show the great advance that has recently been made in the use of open-hearth steel rails; also the increasing use of alloyed and electric steel rails. Tables showing the production of structural steel, plates and sheets, wire rods, tinplates and terne plates, cut nails, wire nails, etc., for late years are given; also information concerning railroad mileage in the United States.

Canadian coal, iron ore, and pig iron statistics are complete. Detailed statistics of the coal, iron ore and iron and steel industries of Great Britain, Germany, France, Belgium, Spain, Italy, Austria, Hungary, Sweden, Russia, Japan, China, India, Australasia, etc., in 1909 or 1910 are also given; also the railway mileage of the world in 1909. Complete statistics of the world's production of iron ore, coal, pig iron and steel are valuable features of the report. The foreign statistics are exceptionally full.

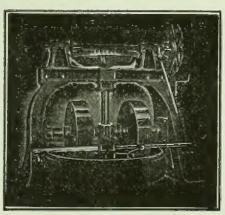
The report contains 120 pages and is well printed on good paper. It will be sent by mail in a strong envelope to all who may order it, thus insuring its receipt in perfect condition.

Price, $5.00, or 21 shillings per copy

Orders and Remittances may be addressed to

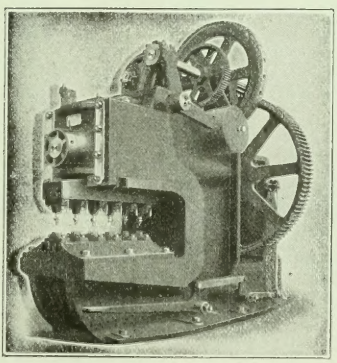
INDUSTRIAL WORLD, : : : 108 Smithfield Street, Pittsburgh, Pa.

Phillips & McLaren Co.,
PITTSBURGH, PA.



Manufacturers of
Shears, Roll Lathes, Machinery and Castings for Rolling Mill, Steel Works, etc.
Rock and Ore Crushers.
STANDARD WET AND DRY GRINDING PANS.
Eastern Office:
STEPHEN GIRARD BLDG., PHILADELPHIA, PA.

MACKINTOSH, HEMPHILL & CO.,



Multiple Punch. Motor Power.

(Fort Pitt Foundry.)
Twelfth and Etna Streets, Pittsburgh, Pa.

Manufacturers of

ROLLING MILLS,

Hydraulic or Geared Shears, Presses, Punches, Riveters.

Corliss, Reversing, Blowing

ENGINES

Iron, Steel and Brass Castings.

Iron and Steel Works Machinery.

AIR COMPRESSORS, Steam and Power PUMPS, Deep WELL PUMPS, VACUUM PUMPS and CONDENSERS.
CORRESPONDENCE SOLICITED.

HALL STEAM PUMP CO,
GRANT AVENUE, NORTH SIDE, PITTSBURGH, PA.

PITTSBURG-BUFFALO COMPANY.
Gas and Steam Coal, Coke, Face Brick, Sewer Pipe, Cement and Builders' Supplies.
GENERAL OFFICES: - - - FRICK BUILDING, PITTSBURG, PA

If You Want Satisfaction Buy Homestead Valves

The Four-Way type, shown here, is unequalled for operating hydraulic and pneumatic machinery of all kinds, and many other purposes. It always works perfectly and can be depended upon for wonderful durability. Booklet?

HOMESTEAD VALVE MFG. CO.
PITTSBURGH, PA., U. S. A.

The Builder—
The Mill Superintendent—
The General Manager of Sales—

All Are Reached Through the Advertising Columns of

The Industrial World

The Connellsville Manufacturing & Mine Supply Co., INC.

Connellsville, Penn'a.

—MANUFACTURERS OF—
Pumping and Hoisting Machinery
Mine Fans, Air Compressors, Etc.
—COMPLETE EQUIPMENTS—
For Coal and Coke Works.

LOCOMOTIVE CRANES

STEAM OR ELECTRICALLY OPERATED
Arranged for handling
Grab Bucket, Lifting Magnet, Hoisting Block
and other special applications.

THE LATEST DESIGN OF THE FOREMOST MANUFACTURERS
SPECIFICATIONS AND PRICES UPON REQUEST.
WRITE FOR BULLETIN No. 119

LINK-BELT COMPANY
PHILADELPHIA CHICAGO INDIANAPOLIS
New York, 299 Broadway. St. Louis, Central Natl. Bank Bldg.
Boston, 131 State Street. Seattle, 439 New York Block.
Buffalo, 601 Ellicott Square Denver, Lindrooth, Shubart & Co.
Pittsburgh, 1501-3 Park Bldg. New Orleans, Wilmot Machy. Co.
San Francisco, Eby Machy. Co.